

Abstracts from the 38th Annual Meeting of the Society of General Internal Medicine

SCIENTIFIC ABSTRACTS

“WE ALL HAVE DIFFERENT STORIES”: VETERANS’ EXPERIENCES AND PREFERENCES FOR PROACTIVE IN-BETWEEN VISIT CARE

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BACKGROUND: Medical home models, like VA’s Patient Aligned Care Team (PACT) seek to engage patients via proactive outreach for prevention and chronic disease management (panel management). We know little about patients’ perspectives, experiences and preferences in receiving this type of non-face-to-face care. To address this gap and inform future implementation efforts, we conducted a qualitative study of veterans at two VA campuses.

METHODS: We conducted a qualitative study of veterans with hypertension or current smoking, who had participated in a cluster-randomized trial of panel management support in which Panel Management Assistants provided outreach and coaching to veterans. We recruited eligible patients by mail and phone, who were invited to participate in focus groups stratified by hospital, gender (six male and four female groups), and age (under or over age 60). Participants completed brief questionnaires to ascertain their health status and supplemental demographic information. Discussion questions focused on facilitators and barriers to healthy behavior change, experience with proactive outreach, and preferences for receiving care in-between visits. Each focus group was audio recorded and transcribed, and supplemental field notes were taken. A subset of transcripts was reviewed independently by four researchers, who then created an initial consensus codebook. Two researchers independently coded each transcript, modified the codebook as new themes emerged, and met to reconcile coding. Nvivo software was used for analysis.

RESULTS: A total of 1179 patients were invited, 127 were scheduled to attend, and 77 participated. Participants had a mean age of 59 years, were predominantly African American (64 %), and completed at least some college (57 %) with 29 % reporting that they worked outside the home. Most participants had hypertension (78 %), and smoked at least 100 cigarettes in their lifetime (77 %). Participants generally appreciated existing efforts to provide care in between visits including post-discharge phone calls and reminder letters. As one veteran put it, “I don’t mind somebody calling and checking up on me because that’s letting me know that you care...” Participants were receptive to additional outreach for referral, reminders and motivational support in between visits. However, they felt that these outreach efforts should be tailored to their needs and preferences in terms of frequency, content and mode of contact and some had concerns about privacy. Although many participants were open to non-clinicians contacting them as long as they had strong communication skills, empathy, connection to PC teams and training, many felt that the individual should be a veteran or at least able to relate to their military experience. Avoiding medications was a consistent motivator for making lifestyle changes and female

veterans in particular wanted access to more holistic health options either at the VA or within their communities.

CONCLUSIONS: Our findings indicate that veterans are receptive to proactive outreach for prevention and management of chronic conditions, especially when this outreach is personalized and flexible. This study has important limitations as it was restricted only to veterans and those agreeing to attend a focus group. However, the information gathered from this study will be useful to inform the design of future panel management efforts.

“I JUST WANT MY DOCTOR’S UNDIVIDED ATTENTION”: PATIENT PERCEPTIONS OF THE IMPACT OF EMR USE ON COMMUNICATION

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BACKGROUND: The use of the Electronic Medical Record (EMR) in exam rooms can impede the doctor-patient relationship. Little research to date has explored patient perceptions of provider EMR use and the impact on communication. Despite widespread EMR use, few curricula teach providers how to use the EMR to enhance communication with patients. The aims of our study are to identify patients’ perceptions of EMR use and elicit their suggestions to inform development of a patient-centered EMR use curriculum.

METHODS: Patients seen by internal medicine attendings and residents at the University of Chicago’s primary care clinic were randomly selected for our study. One year after EMR implementation, trained research assistants conducted structured telephone interviews with patients using critical incident technique and appreciative inquiry to elicit their positive and negative perceptions of EMR use by physicians. Using constant comparative analysis, three investigators independently coded 10 % of the transcripts to develop the coding library. An additional 10 % of the transcripts were coded to establish inter-rater reliability. The coding library was applied to the remainder of the transcripts for analysis using ATLAS.ti software.

RESULTS: Of the 384 patients selected, 12 were excluded due to disability, language barriers, or death. Of the 372 eligible patients, 113 telephone interviews were completed. The interviews revealed two overarching themes: (1) Clinical Functions of EMR (2) Communication functions of EMR. Six subthemes were identified: (1) Documentation functions of the EMR (2) Clinical Workflow functions of EMR (3) EMR as educational resource (4) Information access, (5) Facilitate Engagement and (6) Physical focus. To date we have analyzed 58 % (56/113) of the transcripts. Overall, 84 % (576/687) of total codes reflected positive perceptions of EMR. The majority of the positive perceptions fell under the “Clinical Workflow Functions of EMR” subtheme (i.e. ‘increases clinical efficiency’ and ‘promotes teamwork and communication between doctors’). For example one patient said ‘they can see all the other doctors’ notes... they really work together as a team. I love it!’ Only 16 % (111/687) of the codes represented negative perceptions. Interestingly, 45 % (50/111) of negative codes fell under the “Physical Focus” subtheme (i.e. ‘poor eye contact’ and ‘unbalanced focus’). For example one patient stated ‘how can you focus on the patient if you’re looking somewhere else... it gets in the way.’

CONCLUSIONS: Patients have both positive and negative perceptions of EMR use. Positive perceptions centered on improving clinical efficiency by promoting efficient note writing and teamwork between providers. Negative perceptions focused on communication skills related to EMR use. Patients with negative perceptions cited poor attentiveness (i.e. poor eye contact, unbalanced focus, etc.). Interestingly, many patients who identified the EMR as a barrier to communication also acknowledged that it was useful in increasing clinical efficiency. By interviewing patients, we gained unique insights into their perceptions of EMR use. We will use our findings to inform a patient-centered EMR use curriculum to teach providers how to use the EMR to enhance communication with patients.

“IT ENCOURAGES THEM TO COMPLAIN”: POTENTIAL UNINTENDED CONSEQUENCES OF ROUTINE PAIN SCREENING AND IMPLICATIONS FOR IMPROVEMENT Sangeeta Ahluwalia³; Risa Cromer⁴; Karleen Giannitrapani⁵; Hannah Schreiber-Baum²; Steven Dobscha²; Erin E. Krebs¹; Karl Lorenz². ¹Minneapolis VA Health Care System, Minneapolis, MN; ²Portland VAMC, Portland, OR; ³RAND Corporation, Encino, CA; ⁴Veterans Health Administration, Portland, OR; ⁵Veterans Health Administration, Los Angeles, CA. (Tracking ID #2192233)

BACKGROUND: The Veterans Health Administration (VHA) implemented the “Pain as the 5th Vital Sign” (P5VS) initiative in 1999, requiring a pain intensity rating on a 0–10 scale at all clinical encounters. We sought to better understand the perceived impact of implementing a routine pain screening program on primary care clinicians and clinical processes in order to identify opportunities for improving pain screening and management.

METHODS: We conducted multidisciplinary focus groups with VHA primary care team members including physicians, nurses, social workers, pharmacists, and other clinical and administrative staff involved in pain screening and management at multiple VHA sites. We explored current screening practices and multidisciplinary roles in pain screening; perceptions of the value of pain screening; preferred approaches to pain screening; and critical information needs for improved screening and management. We audiotaped, transcribed, and qualitatively analyzed the focus groups and characterized themes using constant comparison.

RESULTS: Primary care team members participated in nine multidisciplinary focus groups, each comprised of six to nine respondents. We identified five themes and several subthemes characterizing potential unintended consequences of routine pain screening in primary care: (1) Screening for pain encourages an affirmative response, because a) it prompts patient recall of old and chronic pain (“They say, ‘oh yeah, last year I had this and that’, and just go on and on”); or because b) answering “0” on the 0–10 scale is perceived as non-response (“they’ll eventually think of something and say ‘well now that I think of it, I’ll put something down’”). (2) Screening highlights the presence of a problem rather than directing the patient towards a solution for their pain, hindering self-management efforts (“If we’re asking about pain every visit then over time [the patient] will just assume, ‘it’s a limiting factor for me, I can’t do these things’”). (3) Screening for pain sets an expectation of intervention (“We have to treat the number”); and (4) worsens reliance on drug treatment because visit brevity and limited access to non-pharmacologic approaches preclude exploration of other interventions (“I have a lot of things to do on this short visit, and then there’s this pain. I give him [drug], and I’m done, boom.”) (5) Screening can unnecessarily change the focus of the clinic encounter because a) addressing pain consumes extra time (“They can be there for something else but it seems like then the whole visit will turn to the pain issue. It’s time consuming”); and b) it re-directs the patient from other medical issues (“all [screening] does is refocuses them on the pain and it’s not productive when I need to discuss whether their blood pressure medication is effective”).

CONCLUSIONS: Systematic efforts to address undertreatment of pain through routine screening may heighten expectations for treatment and interfere with other primary care priorities. To maximize the benefits of pain screening, clinicians may need more agency in determining the appropriateness of screening for each patient and the approach to intervening, and both clinicians and patients require greater access to non-pharmacologic and self-management resources.

“THEY ARE INTERRELATED, ONE FEEDS OFF THE OTHER”: A TAXONOMY OF DISEASE INTERACTIONS DERIVED FROM PATIENTS WITH MULTIPLE CHRONIC CONDITIONS Donna M. Zulman^{1, 2}; Cindie A. Slightam²; Jonathan G. Shaw^{1, 2}; Kirsten Brandt³; Eleanor T. Lewis²; Steven Asch^{1, 2}. ¹Stanford University, Stanford, CA; ²VA Palo Alto, Menlo Park, CA; ³Stanford University School of Medicine, Stanford, CA. (Tracking ID #2198546)

BACKGROUND: There is growing awareness that multiple chronic conditions (MCCs) generate challenges that exceed the sum of their parts. Little is known, however, about patients’ perceptions of, and experiences with, condition interactions, and the impact of these interactions on self-management and treatment.

METHODS: We analyzed qualitative data from a study of patients with MCCs to understand patients’ perceptions about how their conditions interact. The study included a survey (administered by mail, e-mail, and in clinic) of patients from an academic medical center and a Veterans Affairs facility. We analyzed survey responses from 383 individuals who had two or more conditions and responded to multiple choice and open-ended questions about how their conditions interact. Patients were asked to indicate their health conditions, circle the condition that bothers them the most, and then respond to the question: “How do your other health problems affect your ability to take care of the health problem that you circled above?” Standard content analysis methods were used to code textual data, with the goal of identifying: 1) patients’ perceptions about the extent to which their conditions interact, and 2) the nature of those interactions. Four investigators iteratively reviewed textual data to develop a taxonomy of mutually exclusive codes capturing types of condition interactions, and cross-cutting themes about the quality of interactions. After refining codes and themes with all collaborators, three investigators independently coded all responses and collectively chose representative quotes. Themes and representative quotes were validated through an online survey with a sample of study participants.

RESULTS: Among survey respondents, the mean (SD) number of chronic conditions was 4(2) with the most common including hypertension (60 %), chronic pain (49 %), arthritis (41 %), depression (32 %), diabetes (29 %), and PTSD (26 %). Patients described interrelated relationships among their MCCs and treatments. For example, patients described condition-condition interactions (“The constant worry about prostate cancer recurrence aggravates my anxiety and depression”), condition-treatment interactions (“My back pain keeps me from getting enough exercise which makes it difficult to manage my weight which ultimately is bad for my already damaged heart”), treatment-condition interactions (“The epidurals I had [for chronic pain] caused extremely high blood sugar levels causing anxiety”), and treatment-treatment interactions (“Cancer treatments have caused fatigue and interrupted spine care”). Some patients expressed uncertainty about, or denied the presence of, condition interactions, while others described cyclic/multi-dimensional interactions (“Chronic pain causes loss of sleep and restless leg syndrome, which keeps me awake, exacerbating my depression and anxiety”). Cross-cutting themes included the presence of positive interactions (“What I do for diabetes has a beneficial effect on my other conditions”) as well as negative interactions (above), discussions about causal relationships (“It is the cancer and its required medications that causes the other health problems”), and frequent comments describing interactions among physical and mental health conditions.

CONCLUSIONS: This qualitative study revealed a novel taxonomy of condition interactions from the perspective of patients with MCCs. In order to support self-management and strengthen shared decision-making, it is important to address patients’ perceived interrelated symptoms and condition-treatment interactions.

“WE FOLLOW-UP”: IMPROVING FOLLOW-UP, COMMUNICATION AND DOCUMENTATION OF OUTPATIENT TEST RESULTS BY DUKE RESIDENTS Aparna C. Swaminathan; Joel C. Boggan; Samantha Thomas; Jonathan Bae. Duke University Health System, Durham, NC. (Tracking ID #2191330)

BACKGROUND: Following up on outpatient test results is a time-consuming process that has important patient safety implications. Failure to inform patients of test results and document communication may lead to diagnostic and therapeutic delays and are common sources of malpractice claims. We sought to compare the rates of follow up, communication, and documentation of outpatient test results by Duke residents before and after an educational quality improvement effort.

METHODS: All three resident clinics—a community-based clinic (Clinic 1), a Veterans Affairs clinic (Clinic 2) and a private practice model (Clinic 3)—were included in this study. A follow-up standard was developed to include definitions of ‘significant’ test results and appropriate times to follow-up. A predetermined subset of test results with significant results were to be communicated to patients within 72 h, while other, ‘non-significant’ results were to be communicated with 14 days. An online interactive experience to guide the project was developed utilizing Microsoft Sharepoint™. Residents were required to participate in this mandatory residency-wide project as part of their regularly scheduled ambulatory blocks during each half of the academic year 2013–14. We examined follow-up rates both before and after an intervention that provided resident physicians with education, feedback, and real-time comparison to their peers.

RESULTS: Seventy-six residents completed the online module prior to the intervention (reviewing 1713 patient charts), and 73 residents completed the online module subsequent to the intervention (reviewing 1509 patient charts). At baseline 78 % of test results were communicated to patients within 14 days (Table 1). After our educational intervention, this rate of communication significantly improved to 85 % ($p < 0.001$). This observation held true across all clinic sites (Clinic 1: 69.5 vs. 79 %, Clinic 2: 85 vs. 89 %, Clinic 3: 86 vs. 94 %, $p < 0.02$ for all). Of the test results reviewed, 32 % were significant. The rate of communication of significant test results within 72 h also improved, from 70 % before the

intervention to 81.5 % afterwards ($p < 0.01$). Prior to the intervention, 50 % of all results were communicated through patient letters and 23 % via phone calls. Letters were used more commonly for non-significant results (56 vs. 39 %) while phone calls were used more often for significant results (43 vs. 13 %, $p < 0.001$). Following the intervention the use of patient letters increased from 50 to 56 % ($p < 0.001$), while ratios of other types of communication remained stable. There was no change in the types of test followed up on before or after the intervention.

CONCLUSIONS: This study demonstrates that lack of follow-up of outpatient test results is a common problem, and that our simple educational interventions and feedback resulted in significant improvement across a large internal medicine residency program. Such interventions should be routinely integrated into residency education and patient care. With the prevalence of the electronic medical record it has become even easier to communicate results through letters or online portals. However it remains imperative that communication of time sensitive results occur in a reliable fashion.

“WORLD VAPE DAY” 2014: LESSONS FROM THE TWITTERSPHERE Jason Colditz²; Kevin Pang²; Alton Everette James²; Christine Stanley²; Ellen Beckjord³; Judith Brook¹; Brian A. Primack². ¹New York University School of Medicine, New York, NY; ²University of Pittsburgh, Pittsburgh, PA; ³University of Pittsburgh Cancer Institute, Pittsburgh, PA. (Tracking ID #2198803)

BACKGROUND: “Vaping” with electronic nicotine delivery systems (ENDS) has been increasing since these products entered the US consumer market about a decade ago. ENDS devices, more commonly referred to as e-cigarettes, hookah pens, or vapor pens, present dilemmas for public health advocates and regulatory agencies. For example, while ENDS may be valuable for cigarette smoking cessation among established adult smokers, thousands of non-cigarette smoking individuals are now experimenting with ENDS, which may lead to subsequent sensitization to nicotine and transition to cigarette smoking. ENDS are available in flavorings and packaging which may be attractive to youth. Furthermore, there are limited data on the toxicant load associated with use of these devices. Assessing public sentiment surrounding these products may help guide interventions by discovering information such as apparent misconceptions. Open-ended qualitative assessment of publicly available discussion such as that on social media may help focus researchers on rich data to which millions of people are exposed. Therefore, the purpose of this study was to qualitatively analyze publicly available information on Twitter related to ENDS.

METHODS: We selected Twitter not only because of its extreme popularity (about 400 million “Tweets” consisting of no more than 140 characters each are exchanged each day) but also because of ease of data collection via a programming interface. We focused data collection on one particular day—Thursday, September 18, 2014—which was promoted as “World Vape Day” by multiple businesses, organizations, and individuals. By focusing on this particular day, we hoped to access a valuable perspective on public discourse and perceptions surrounding ENDS use. We retrieved all Tweets and meta-data from the Twitter live-stream using customized software that filtered by relevant keywords, including “e-cig,” “e-hookah,” “vape,” “vapes,” and “vaping.” Two independent coders coded a random sample of 1000 Tweets related to ENDS and developed a comprehensive codebook through an iterative process based on grounded theory. This approach allowed us to (1) better understand public discourse surrounding ENDS use and the nature of World Vape Day specifically, (2) develop a structured content analysis framework (i.e., codebook) that future research projects may utilize or adapt, and (3) provide an open source software tool for other researchers to more-easily utilize live Twitter data for similar projects.

RESULTS: The filtered Twitter stream resulted in 5205 tweets over a strategically selected 12 h span. Five random subsamples of 200 tweets were double-coded and discussed in order to develop and refine the coding framework. This resulted in broad coding categories including positive and negative sentiment, health- and policy-related, cigarette-related, and marketing. The coders then independently coded a randomized subsample of 1000 different ENDS-related tweets. Inter-rater agreement for each coded variable was good-to-perfect (Cohen’s kappa ranged from 0.56 to 1.00 depending on the variable). Marketing-related messages were highly prevalent (41 %), while only 8 % of Tweets were related to health and only 3 % were related to policy or law. Of non-marketing tweets, coders detected more positive than negative sentiment (24 vs. 13 %). Open-ended content analysis yielded additional nuance to each of the broad coding categories and revealed valuable insights into contextual associations with ENDS in public discourse. For example, marketing messages focused on diversity of ENDS devices and associated parts/accessories for modifying and refilling them (e.g., high-power batteries, unique shapes and colors, novel flavors of “vape juice” or “e-liquid”). Users frequently referred to flavorings, social settings and social approval, and modifications (i.e., “mods” such as building, modifying, or personalizing ENDS devices). Young adults and teenage users seemed to focus on general social approval (e.g., “coolness”) and use at school.

CONCLUSIONS: Examination of Tweets exchanged on “World Vape Day” provided a valuable window into discourse from ENDS marketers and end-users. After an appropriate iterative codebook development process, double-coding was internally consistent. Available data suggest that ENDS represents a highly active area ripe with technical innovation by marketers and consequent excitement and invigoration among users. While the medical and public health community are actively interested in potential health implications and legal loopholes potentially created by this phenomenon, these themes were not commonly manifested in our sample of Tweets. These are trends of which researchers and practitioners should be aware when engaging in dialogue related to ENDS usage. Continued research and effective translational approaches are needed to inform the medical community of these emerging trends in ENDS use, which is a growing medical and public health concern.

INAPPROPRIATE NONFORMULARY REQUESTS: FORMULARY COMPLIANCE THROUGH CLINICAL DECISION SUPPORT IN AN ACADEMIC MEDICAL CENTER Qoua L. Her^{1,2}; Mary Amato^{1,2}; Diane L. Seger^{1,3}; James F. Gilmore¹; John Fanikos¹; Julie Fiskio³; David W. Bates^{1,3}. ¹Brigham and Women’s Hospital, Boston, MA; ²Massachusetts College of Pharmacy and Health Services University, Boston, MA; ³Partners Healthcare, Wellesley, MA. (Tracking ID #2195247)

BACKGROUND: Formularies are widely accepted as a cost containment tool, and can also help enhance medication safety, quality of care, and improve care efficiency.(1) Medicare and The Joint Commission require a formulary for reimbursement and hospital accreditation, respectively. The Joint Commission expanded their requirement mandating hospitals to at least review their formulary annually base on emerging safety and efficacy information, standardizing and limiting available drug concentrations, and implementing a process to select, approve, and procure nonformulary medications (NFM).(2) Such mandate expansion has the potential to increase hospital cost beyond the cost-savings of formularies in the form of physician and pharmacist time complying with formulary policies.(1) Appropriate clinical decision support (CDS) for formulary management can help realize these cost-savings. We evaluated a NFM system at a large academic medical center, quantified the proportion of inappropriate NFM requests, and used the results to develop best practice guidance on the design of automated formulary management systems.

METHODS: All approved NFM requests from Brigham and Women’s Hospital from 2009 to 2012, were extracted and quantified according to the American Hospital Formulary System (AHFS) Classification. A random sample of 2000 approved NFM requests were selected for preliminary ‘reason of NFM request’ analysis. Reasons were categorized and presented to an interdisciplinary panel of physicians, nurses, and pharmacists, where NFM appropriateness criteria were developed. A random sample of 206 requests from 2012 of the 11 most expensive and most frequently approved NFMs were further reviewed for appropriateness using the interdisciplinary appropriateness criteria by two pharmacists. Agreement between the reviewers was assessed using a Cohen’s kappa. Best practice guidance for automated formulary management systems were developed from these findings.

RESULTS: A total of 223,266 original NFM requests were approved between 2009 and 2012. The top 50 % of these approvals were classified into six AHFS Tier 2 Classes. Psychotherapeutic agents accounted for one-fifth of all NFM approvals, where quetiapine and olanzapine accounted for 62.6 % of all psychotherapeutic agents approved. We found that 46.9 % of the reasons for NFM requests provided no or marginal value for nonformulary appropriateness evaluation and could be considered inappropriate at the point-of-care. Approximately one-third of all approved NFM requests were for chronic or pre-admission medications. Other reasons listed includes disease/conditions, specialist or pharmacist recommendation, failure or intolerant of formulary alternatives, allergy or contraindication, end-of-life care, and medication interactions. The interdisciplinary panel simplified the complex NFM request reasons into four NFM appropriateness criteria. The review of 206 inpatient charts estimated that approximately 18 % of all approved NFM request were truly inappropriate. We recommend the following features for any automated formulary management system; 1) require prescribers to provide a ‘valid’ reason for NFM request to enhance retrospective medication utilization review (MUE) and trending; 2) provide pharmacists with a ‘comment option’ at the point of computer order verification to address inappropriate requests or reasons that provide no or marginal value for retrospective MUE; 3) utilize drop-down menus for standard and common NFM request reasons to facilitate deployment of more complex CDS, such as automated interchange for specific indications; and 4) begin annual clinical decision support and formulary reviews with the most expensive and commonly requested NFM (psychotherapeutic agents).

CONCLUSIONS: We found that nearly one-fifth of all NFM requests at our institution were inappropriate. Optimization of the NFM computer system could decrease the proportion of inappropriate NFM requested and improve cost-savings. NFM request systems with better tracking and trending features will guide better CDS development for automated formulary management. This study was funded by grant #U19HS021094 from the Agency for Healthcare Research and Quality (AHRQ). 1. Helmons PJ, Kosterink

JG, Daniels CE. Formulary compliance and pharmacy labor costs associated with systematic formulary management strategy. *Am J Health Syst Pharm*. 2014;71(5):407–15. doi:10.2146/ajhp130219 2. Rich DS. New JCAHO medication management standards for 2004. *Am J Health Syst Pharm*. 2004;61(13):1349–58.

SIMILARITIES AND DIFFERENCES IN COMMUNITY, ACADEMIC, AND HEALTHCARE STAKEHOLDERS' PERSPECTIVES OF IMPORTANT CONTRIBUTORS TO TRUST IN RESEARCH PARTNERSHIPS Leah Frerichs¹; Crystal W. Cene²; Gaurav Dave²; Mimi Kim²; Tiffany L. Young²; Anne Cheney³; Jessica Burke⁴; Jennifer Jones⁴; Arlene Brown⁵; Linda Cottler⁶; Giselle M. Corbie-Smith^{1, 1}. ¹University of North Carolina, Chapel Hill, NC; ²University of North Carolina at Chapel Hill, Chapel Hill, NC; ³University of Arkansas, Fayetteville, AR; ⁴University of Pittsburgh, Pittsburgh, PA; ⁵University of California, Los Angeles, Los Angeles, CA; ⁶University of Florida, Gainesville, FL. (Tracking ID #2194545)

BACKGROUND: Community engagement is recognized as critical to furthering translation of evidence to practice and improving quality of care. Research partnerships among community, academic, and healthcare institutions have become a common avenue for community engagement, a recommended strategy to address health disparities. These partnerships have found that trust between the diverse stakeholders is foundational to their success; yet, there has been limited empirical research on determinants of trust. The objective of this study was to determine the similarities and differences among community member, academic researcher, and healthcare provider stakeholders' perspectives on important contributors to creating and maintaining trust within research partnerships.

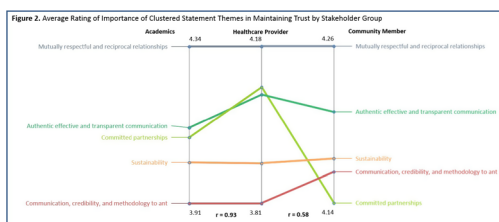
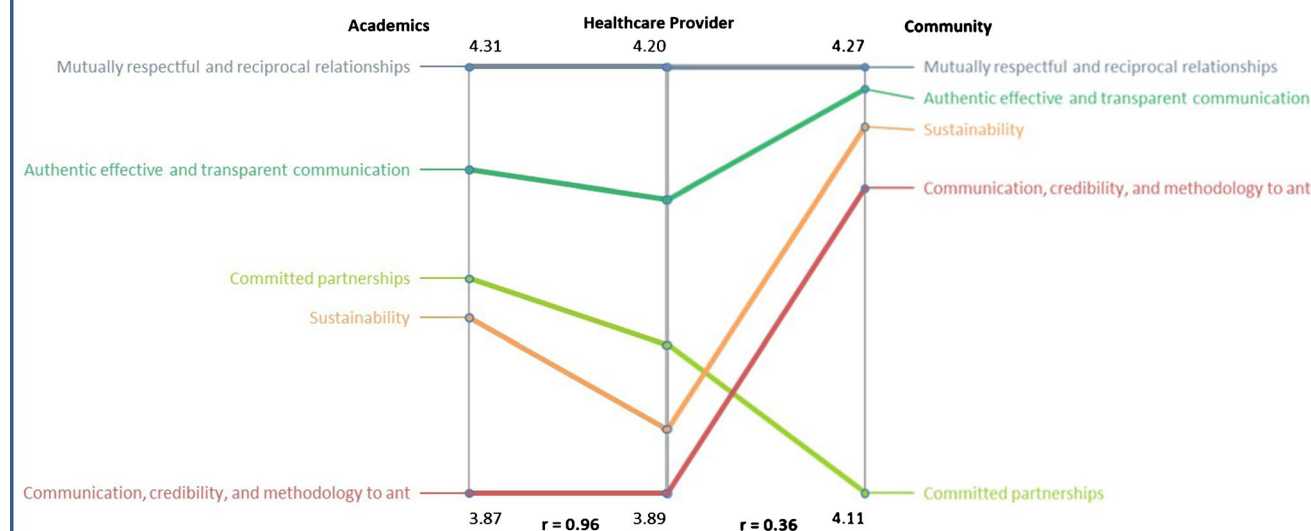
METHODS: Across four institutions (University of Arkansas, University of California Los Angeles, University of Florida, and University of North Carolina) with Clinical and Translational Science Awards, we conducted concept mapping sessions with participants from three stakeholder groups. A fifth site, University of Pittsburgh, served as the data coordinating center. Each site conducted brainstorming sessions with each stakeholder group to generate lists of statements viewed as contributing to trust in community-academic research partnerships. All participants rated each statement by level of importance for creating and maintaining trust using a 5-point Likert scale (1=not important, 5=

very important). Data were analyzed using Concept Systems Global Max©. Multi-dimensional scaling and hierarchical cluster analysis were used to determine statements that clustered together based on sorting and rating data, and clusters were collaboratively labeled by each stakeholder group. We compared and contrasted average ratings of statement clusters and assessed correlation of all statement ratings across stakeholder groups.

RESULTS: Participants ($n=65$ community members, $n=74$ academic researchers, and $n=47$ healthcare providers) generated 125 unique statements that clustered into the following five themes: mutually respectful relationships, authentic communication, committed partnerships, sustainability, and communication and methodology to anticipate changes. Community members overall average rating of statements was higher (4.20) than academic researchers (4.10) and healthcare providers (4.02). Ratings of importance for creating and maintaining trust were highly correlated ($r=0.96$ and $r=0.93$) between academic researchers and healthcare providers, and less correlated between healthcare provider and community members ($r=0.36$ and $r=0.58$) and academic research and community members ($r=0.31$ and $r=0.81$). Figures 1 and 2 provide ladder graphs of average importance ratings of statement clusters by stakeholder group. The ranked order of average importance (i.e., lowest to highest) of the five clusters differed for community members compared to academic researchers and healthcare providers.

CONCLUSIONS: While there were similarities, we also found important differences between the ratings of the three stakeholder groups. Healthcare providers and academic researchers often have overlapping roles and similar work cultures that likely contribute to greater correlation in their importance ratings. Without proper attention, there is a risk that these similarities will mutually reinforce perspectives that differ from community members and create power imbalances that undermine trust between community members and researchers; thereby, potentially reducing efficiency (e.g., recruitment of underserved research participants) and quality (e.g., completeness of self-reported data) of research. Our findings identified specific areas of convergence and divergence of perspectives, which may be leveraged to improve trust. For example, partnership sessions could use role-playing exercises to help stakeholders build upon common perspectives as well as understand differences. More research is merited to explore the mechanisms that create differences in stakeholders' perspectives of trust.

Figure 1. Average Rating of Importance of Clustered Statement Themes in Creating Trust by Stakeholder Group



COMMUNITY HEALTH WORKERS ARE ASSOCIATED WITH PATIENT REPORTED ACCESS TO CARE WITHOUT AFFECT ON SERVICE UTILIZATION AMONG LATINOS WITH POORLY CONTROLLED DIABETES Aileen Chang¹; Victor Cueto¹; Hua Li¹; Bhavana Singh³; Sonjia Kenya²; Yisel Alonzo¹; Olveen Carrasquillo¹. ¹University of Miami, Miami, FL; ²University of Miami Miller School of Medicine, Miami, FL; ³Duke University, Durham, NC. (Tracking ID #2190676)

BACKGROUND: Community health workers (CHWs) are one promising approach to improve diabetes care among vulnerable populations. However, few rigorous randomized

studies have evaluated the impact of CHWs on service utilization. The Miami Health Heart Initiative (MHII) was a clinical trial testing the impact of a CHW intervention on physiologic outcomes among low-income Hispanics with poorly controlled diabetes versus usual care (USC). Preliminary data from MHII suggests that as compared to the USC group patients randomized to the CHW group had improvements in blood pressure and hemoglobin A1C. In this abstract we report the impact of the CHW intervention on access to care and service utilization.

METHODS: We analyzed data from 215 Hispanics with poorly controlled diabetes recruited via physician referral and electronic medical record (EMR) from Miami's public hospital system. Self-reported access to care measures were similar to those used in the Medical Expenditure Panel Survey (MEPS) and included the ability to access care when needed, obtain needed medications, ability to contact physicians and communicate in language of choice. Self reported utilization measures were also collected using MEPS questions and included number of care encounters and percent with inpatient stay. We also abstracted utilization data on outpatient visits, emergency room (ER) visits and hospitalizations from the EMR at the public hospital. Statistical significance of continuous outcomes were examined using the *t*-test if normally distributed or the Kruskal-Wallis test when not normally distributed. Categorical variables were examined using chi-square comparisons or generalized estimating equation (GEE) modeling when needed. We also performed logistic regression adjusted for age, gender, education, depression, and comorbidities on access to needed health care and medications.

RESULTS: This was a vulnerable population with 42 % having less than 12 years of education and 72 % were depressed. At 1 year, we found statistically significant differences in 2 of 4 self-reported access to care measures. For example, 30 % of the participants in the CHW group reported inability to access care in the last year compared to 43 % in the USC group ($p=0.04$). Additionally, 28 % of the participants in the CHW group reported inability to access medications in the last year compared to 41 % in the USC group ($p=0.03$). The differences in access to needed care and needed medications persisted after adjustment for age, gender, education, depression, and comorbidities with (OR=0.52, 95 % CI=0.29, 0.93) and (OR=0.45, 95 % CI=0.24, 0.82) respectively. Self-reported measures of utilization were similar in both groups with a median of seven care encounters in the past year and about a third reporting an inpatient stay in the last year. Similarly, EMR review found similar rates of outpatient visits, ER utilization and percentage having as hospital stay in the last year between the CHW and USC groups.

CONCLUSIONS: Among patients with diabetes, a greater percentage of those having a CHW intervention reported access to care but we found no significant changes in service utilization.

A COMPARISON OF IHI OPEN SCHOOL TO A FACULTY-LED QUALITY IMPROVEMENT AND PATIENT SAFETY CURRICULUM FOR UNDERGRADUATE MEDICAL EDUCATION Jason Fish¹; Michael Burton¹; Tammy Chung²; Deepa Bhat²; Meredith Mayo². ¹UT Southwestern, Dallas, TX; ²UT Southwestern Medical Center, Dallas, TX. (Tracking ID #2198367)

BACKGROUND: Education in the principles and practice of quality improvement (QI) and patient safety is now required in undergraduate medical education. Most QI curriculum studies involving medical students have utilized didactics and web-based learning, with the majority providing less than 10 h of contact hours. Student knowledge, attitudes, and beliefs have been the mainstay of assessments, with no literature found focusing on assessment of QI skills or self-efficacy. In addition, the lack of resources and faculty expertise in QI have led to many institutions turning to online curricula. While requiring less faculty participation, the relative effectiveness and acceptance of online learning modules in QI has not been determined. This study evaluates the comparative effectiveness of a well-established online QI curriculum (online) with a Faculty-led face-to-face curriculum (pilot) for undergraduate medical education.

METHODS: Third-year medical students rotating through the University of Texas Southwestern Medical School Internal Medicine and Family Medicine services from July 2012 to June 2013 were included in this study. Students were randomly assigned to either a series of four weekly live didactic sessions with an applied, simulation project or to complete a predetermined subset of the Institute for Healthcare Improvement's Open School online modules. The objectives for both curricula included 1) understanding basic concepts of QI/PS, 2) developing specific aim statements and identifying key stakeholders; 3) understanding fundamental concepts of measurement; 4) learning QI tools; and 5) recognizing human factors associated with change. All participants were asked to complete a modified Quality Improvement Knowledge Assessment Tool (QIKAT) at the beginning and conclusion of the study period. The QIKAT assesses attitudes and beliefs as well as QI skills through the use of clinical scenarios to identify improvement strategies.

At the end of each 4 week period, students were asked to complete an online survey on student satisfaction, perceived effectiveness, and self-efficacy on being able to participate in, teach, and lead QI projects.

RESULTS: One hundred seventy-four students participated in the study—86 in the pilot and 88 in the online. Completion rates for the monthly surveys were 64 % (pilot) and 75 % (online). Using a Likert scale 1 to 5 (1 being least satisfied/comfortable and 5 being most satisfied/comfortable) for the monthly survey, the mean scores for the pilot and online groups were as follows: effectiveness of course 3.47, 2.91 ($p<0.001$); satisfaction with course delivery 3.48, 2.88 ($p<0.001$); confidence in participating in QI project 3.10, 2.61 ($p<0.01$); confidence in teaching QI principles 2.62, 2.38 ($p=0.08$); and confidence with leading a QI project 2.50, 2.28 ($p=0.13$). The modified QIKAT clinical scenario section was assessed with a 10 point score. The pilot group had 97 and 93 % completion rates for the pre- and post-surveys respectively; the online group had 83 and 82 % completion rates for the surveys respectively. The pre- and post-test average QIKAT scores for the pilot group were 2.77 and 3.12; the scores for the online group were 2.70 and 2.54. There was no difference between the pilot and online groups for the pre-test or post-test mean scores ($p=0.72$; $p=0.08$), nor between the paired pre- and post-test means (pilot $p=0.27$; online $p=0.95$). The components of the QIKAT score included assessment of skills involving specific aim statements, stakeholders, current knowledge and processes, measurement and intervention design, and continuous process improvement strategies. The pilot group had statistically significant higher scores on specific aim statements ($p<0.01$) and trended towards significance on identifying processes and stakeholders ($p=0.07$). There were no statistical significant differences in the other skills.

CONCLUSIONS: Our research indicates students in the face-to-face pilot program reported the course as more effective and more satisfying than those students in the online program. Students in the pilot also reported greater self-efficacy for future participation in QI projects than the on-line group. Although the study did not demonstrate a difference in overall effectiveness by objective measures, our study did indicate that the combination of didactics with an applied, simulation project improved some QI skills. More research is needed to identify important strategies to achieving sustainable and significant gains in applying QI/PS knowledge and demonstrating skills.

A QUALITATIVE EXAMINATION OF ATTITUDES TOWARD SMOKE-FREE POLICIES AMONG HOMELESS ADULTS Maya Vijayaraghavan^{1, 2}; Samantha Hurs²; John Pierce^{1, 2}. ¹University of California, San Diego, San Diego, CA; ²Division of Health Policy, San Diego, CA. (Tracking ID #2192801)

BACKGROUND: Smoke-free policies in indoor and some outdoor public spaces and the workplace has become normative in many states across the United States. These policies are an integral component of current population-wide tobacco control efforts. While there is widespread support for these policies among the general public, attitudes toward these policies among populations where the majority are smokers, such as the homeless population (70–80 % smoking prevalence), is unknown. In this study, we examined attitudes toward smoke-free policies among sheltered homeless adults.

METHODS: Quantitative and qualitative data were collected from 65 current and former smokers residing in seven transitional, or long-term homeless shelters in San Diego County. All of the participating shelters had indoor smoking restrictions, and four facilities also had outdoor bans on smoking. We administered a questionnaire to participants on smoking behaviors and perceived norms around smoking, and conducted eight focus groups to discuss attitudes toward smoke-free policies. We examined the association of smoke-free policies and perceived norms around smoking. We used a directed qualitative content analysis approach to analyze the focus group transcripts.

RESULTS: The sample included 62 current smokers and 3 former smokers. The mean age was 43.1 years (SD 11.5), 44.6 % were male, and 49.2 % were white. Average daily cigarette consumption for current smokers was 8.9 cigarettes per day. Approximately half the current smokers reported making a quit attempt in the past year. Fewer than one-fourth reported using nicotine replacement therapy or medications in a prior quit attempt. The majority of participants who lived in facilities that had fewer restrictions on smoking reported that staff smoked with them during breaks compared to those living in facilities with more restrictions ($p<0.001$). In focus group interviews six major themes emerged: attitudes toward smoke-free policies, support for smoke-free housing, the use of electronic cigarettes, addictive potential of cigarettes, vulnerability to tobacco industry marketing, and interest in smoking cessation. The majority of current smokers and all former smokers were supportive of smoke-free policies because they limited secondhand smoke exposure to non-smokers and children. However, some current smokers who felt that the policies thwarted their autonomy to smoke felt marginalized by neighborhood-wide and countywide smoke-free policies. All current smokers were supportive of and did not express concerns about transitioning to low-income smoke-free housing. Cigarette smokers had tried electronic cigarettes because of the perception that they were safe and

could be smoked in areas where smoking was prohibited, and/or used as a cessation aid. Some of the current smokers described their vulnerability to tobacco industry marketing, and felt targeted in part due to their addiction to nicotine and challenges with smoking cessation. The majority of current smokers described interest in smoking cessation and highlighted potential strategies to aid in smoking cessation attempts.

CONCLUSIONS: The general acceptance of smoke-free policies may highlight a shift in social norms around smoking in the homeless population; such policies may present an important strategy to reduce social inequalities and health disparities related to tobacco use among vulnerable populations. Findings highlight potential opportunities to increase acceptance of such policies and to educate about the potential risks of electronic cigarettes among the homeless population.

A SILVER-LINING IN THE CLOUDS? A QUALITATIVE ANALYSIS OF PATIENT'S SENTIMENTS ON HOSPITALIST SERVICE CHANGES Charlie M. Wray¹; Jeanne M. Farnan¹; Vineet M. Arora²; David Meltzer¹. ¹University of Chicago, Chicago, IL; ²University of Chicago Medical Center, Chicago, IL. (Tracking ID #2196253)

BACKGROUND: Inpatient service handoffs are a frequent source of discontinuity in inpatient care. Despite the large amount of research on handoffs, none has described the patient perspective when cared for by a hospitalist physician. We sought to qualitatively describe hospitalized patient's experiences regarding service changes and develop a conceptual framework from which to understand the patient perspective for future research.

METHODS: We approached hospitalized patients on the non-teaching hospitalist service at an academic tertiary care medical center whose hospitalizations spanned a weekly service change. Consenting patients were administered a semi-structured interview developed to elicit their perspective regarding physician service change. Questions were informed by expert opinion and existing literature review. All responses were digitally recorded, deidentified and transcribed. Grounded theory was utilized, with an inductive approach with no a priori hypotheses. The constant comparative method was used to generate emerging and reoccurring themes. Units of analysis were sentences and phrases. MAXQDA 11 was used to ease analysis.

RESULTS: The overall response rate was 96 % (22/23). Respondents had a mean age of 53.6 years (± 15.6), with 60 % being female, and 56 % African American. At the time of interview, respondents had a mean LOS of 6.8 days (± 4.0) and averaged 2.3 (± 0.6) hospitalists/patient. The analysis yielded 192 discrete mentions that were mapped into 20 themes representing patients' thoughts on hospitalist changeovers. Predominant themes were: importance of communication (82 %, 18/22), a lack of concern about the transition (63 %, 14/22), a lack of awareness that the transition had occurred (50 %, 11/22), new opportunities with a fresh doctor (36 %, 8/22) (ie. "I really liked her... she looked at my ears, when the first doctor never did."), bedside manner (36 %, 8/22) (ie. "...he sat down with me and spent the time to talk to me. I liked that."), and trust (32 %, 7/22). Like themes were assembled into larger domains of construct, which included: communication, doctor-patient relationship, and systems-based issues.

CONCLUSIONS: The cloudy nature of service changes is evident from the findings that although almost all patients mentioned the importance of communication, only half were aware that a transition had occurred. Interestingly, some viewed service changes as a positive opportunity to address their care needs with a new doctor, appreciated good bedside manner, and trusted their new physician. These silver linings could represent an opportunity for hospitalists to rapidly form effective doctor-patient relationships with their patients. Better education of patients as to the occurrence and potential positive and negative effects of inpatient service changes is needed to both understand and improve care transitions from a patient-centered perspective.

APPROPRIATENESS OF ECHOCARDIOGRAPHY ORDERING IN AN AMBULATORY INTERNAL MEDICINE RESIDENT CLINIC. Abdulaziz R. Algethami¹; Rajan S. Bhatia¹; Brian Wong²; Tina Borschel¹. ¹Women's College Hospital, Toronto, ON, Canada; ²Sunnybrook Health Science Centre, Toronto, ON, Canada. (Tracking ID #2194950)

BACKGROUND: The American college of echocardiography had published criteria for appropriate use of echocardiography (AUC) to ensure echocardiography services are utilized in ways that will most impact patient care. Previous studies have suggested increased rates of inappropriate ordering of echocardiography in the ambulatory environment, but to date there is little data about echocardiography appropriateness in a medical resident run clinic.

METHODS: We conducted a retrospective chart review to examine outpatient transthoracic echocardiogram ordering by internal medicine residents over a 12 month period. We classified echocardiograms ordered into three categories: Appropriate (A), Inappropriate (I) and Uncertain (U) as per the 2011 AUC criteria for transthoracic echocardiography.

RESULTS: A total of 61 echocardiograms were reviewed. The median patient age was 62 ± 18 years (65.5 % female). The proportion of studies classified as appropriate was 82 %. The proportion of inappropriate studies was 8 % and the proportion of uncertain studies was 10 %. The proportional percentage of appropriate studies between males and females was similar. Common inappropriate indications were LV assessment with a recent normal LV assessment (5 %), presyncope without symptoms or signs of cardiac disease (2 %) and for initial diagnosis of pulmonary embolism (2 %).

CONCLUSIONS: Overall, the proportion of inappropriate echocardiograms ordered in this resident run clinic was lower than has been previously reported in outpatient studies. It is possible that education and initiatives such as the Choosing Wisely campaign have improved appropriate ordering.

ASSOCIATION BETWEEN THYROID DYSFUNCTION AND ANEMIA: A LARGE POPULATION-BASED STUDY Khadija M'Rabet-Bensalah¹; Christine Baumgartner¹; Michael Coslovsky⁵; Tinh-Hai Collet⁴; Wendy P. den Elzen³; Robert N. Luben²; Anne Angelillo-Scherer¹; Drahomir Aujesky¹; Kay-Tee Khaw²; Nicolas Rodondi¹. ¹Inselspital, Bern University Hospital, Bern, Switzerland; ²University of Cambridge, Cambridge, United Kingdom; ³Leiden University Medical Center, Leiden, Netherlands; ⁴University Hospital of Lausanne, Lausanne, Switzerland; ⁵University of Bern, Bern, Switzerland. (Tracking ID #2191357)

BACKGROUND: Anemia and abnormal thyroid function are common disorders that often co-occur in the elderly. Most textbooks and guidelines mention that thyroid-stimulating hormone (TSH) should be measured in the work-up of anemia. However, data on the association between thyroid dysfunction and anemia are scarce.

METHODS: In the population-based European Prospective Investigation of Cancer (EPIC)-Norfolk cohort, we examined 12,972 men and women aged 39–79 years with measured thyroid function and hematological parameters. Thyroid dysfunction was defined as hypothyroidism when TSH was >4.49 mIU/L, either subclinical (SHypo) with normal free thyroxine (FT4) or overt (OHypo) with low FT4, and as hyperthyroidism when TSH was <0.45 mIU/L, either subclinical (SHyper) with normal FT4 or overt (OHyper) with elevated FT4. Anemia was defined as hemoglobin (Hb) <13 g/dL for men and <12 g/dL for women based on the WHO definition. We examined the association between thyroid function and anemia, as well as Hb levels, using linear regression models first with adjustment for age and gender, then for other potential confounding factors. After excluding common causes of anemia, we also compared the prevalence of anemia according to different thyroid functionality groups.

RESULTS: Among 12,972 participants, 55 % were women and the mean age was 58.9 ± 9.5 years. Prevalence of thyroid dysfunction was 1.7 % OHypo, 5.6 % SHypo, 0.6 % OHyper, and 2.8 % SHyper. Anemia was observed in 1058 participants (8.2 %) and was more prevalent among those with thyroid dysfunction (10.3 %) compared to those in euthyroid state (7.9 %). The risk of anemia was increased for OHypo with an age and gender adjusted risk ratio (RR) of 1.55 [95 % confidence interval (CI) 1.10, 2.18] and OHyper with RR 1.86 [CI 1.12, 3.10], but not for SHypo (RR 1.06 [CI 0.84, 1.35]) and SHyper (RR 1.07 [CI 0.77, 1.49]). Hb concentration was decreased in participants with both higher and lower TSH levels (p for quadratic pattern <0.001) in age and sex adjusted analyses, but this association was only significant for participants with OHypo (Hb 0.19 g/dL lower [CI -0.34 , -0.04]) and remained significant after additional adjustment for BMI, smoking, and diabetes. After excluding participants with common causes of anemia, such as iron deficiency, inflammatory disease, and kidney disease, 8.8 % of participants with OHypo ($p=0.048$), 16.3 % with OHyper ($p=0.005$), 5.6 % with SHypo ($p=0.49$) and 3.78 % with SHyper ($p=0.60$) had anemia compared to 4.9 % of the euthyroid participants.

CONCLUSIONS: Overt hypothyroidism and overt hyperthyroidism, but not subclinical thyroid dysfunction, are associated with a higher prevalence of anemia. Given these data from the largest population-based study on this issue, TSH measurement is likely indicated only after excluding other common causes of anaemia.

ASSOCIATIONS BETWEEN TEACHING EFFECTIVENESS SCORES AND CHARACTERISTICS OF PRESENTATIONS IN HOSPITAL MEDICINE CONTINUING EDUCATION John T. Ratelle; Christopher M. Wittich; Roger Yu; James Newman; Sarah Jenkins; Thomas J. Beckman. Mayo Clinic, Rochester, MN. (Tracking ID #2193724)

BACKGROUND: Hospital medicine (HM) is the fastest growing medical specialty in the United States. As HM evolves, the need for successful continuing medical education (CME) will be increasingly important. The Society for Hospital Medicine (SHM) recently developed core competencies for CME. However, there is little research regarding characteristics of effective CME presentations in HM. Our objectives were to describe the traits of participants at a national HM CME course, and to identify associations

between validated CME teaching effectiveness scores and characteristics of CME presentations in the field of HM.

METHODS: This was a cross-sectional study of 368 participants, and 30 presenters delivering 32 didactic presentations, at a Mayo Clinic HM CME course in 2014. Participants provided CME teaching effectiveness (CMETE) ratings, which were obtained from an instrument with known content, internal structure, and criterion validity evidence (Wittich et al. JGIM. 2011). The instrument has the following 8 items: 1) clear and organized, 2) relevant, 3) case-based, 4) effective slides, 5) audience interactivity, 6) supporting literature, 7) appropriate length and 8) summary slide. For statistical analysis, overall CMETE scores (5-point scale: 1=strongly disagree; 5=strongly agree) were averaged across items and participants for all presenters. We estimated that this study of >200 participants would provide >90 % power to detect a medium Cohen's effect size of 0.25 for associations between CMETE scores and variables related to characteristics of presentations. Associations between the CMETE overall scores and presentation characteristics were determined using the Wilcoxon rank sum or Kruskal-Wallis test, as appropriate. The threshold for statistical significance was set at $p < 0.05$.

RESULTS: A total of 277 out of 368 participants (75.3 %) returned evaluations, yielding 7947 ratings for statistical analysis. Overall, course participants (number, %), described themselves as hospitalists (181, 70.4 %), ABIM certified with HM focus (48, 18.8 %), physicians with MD or MBBS degrees (181, 70.4 %), nurse practitioners or physician assistants (52; 20.2 %), and in practice >20 years (73, 28 %). The majority of participants (148, 53.4 %) worked in private practice, while only 63 (24.8 %) worked in academic settings. CMETE scores (mean [SD]) were significantly associated with the use of audience response (4.64 [0.16]) versus no audience response (4.49 [0.16]; $p = 0.01$), longer presentations (>30 min: 4.67 [0.13] versus <30 min: 4.51 [0.18]; $p = 0.02$), and larger number of slides (>50: 4.66 [0.16] versus <50: 4.55 [0.17]; $p = 0.04$). There were no significant associations between CMETE scores and use of clinical cases, defined goals, or summary slides.

CONCLUSIONS: To our knowledge, this is the first study regarding associations between validated teaching effectiveness scores and characteristics of effective CME presentations in HM. Course participants were diverse in terms of types of providers and practice settings. Our findings, which support previous research in other fields, indicate that CME presentations may be improved by increasing interactivity through the use of audience response systems, in addition to allowing longer presentations. Future research should determine whether course content that reflects the SHM core competencies improves the quality of CME presentations.

BASELINE OPIOID USE AS A PREDICTOR OF TELECARE COLLABORATIVE PAIN MANAGEMENT OUTCOMES Erin E. Krebs^{2, 3}; Kurt Kroenke^{4, 1}; Jingwei Wu¹; Matthew J. Bair^{4, 1}; Zhangsheng Yu¹. ¹Indiana University, Indianapolis, IN; ²Minneapolis VA Health Care System, Minneapolis, MN; ³University of Minnesota, Minneapolis, MN; ⁴Roudebush VAMC, Indianapolis, IN. (Tracking ID #2192185)

BACKGROUND: Use of opioids for chronic pain is controversial. Among patients with chronic pain, receipt of opioid therapy is associated with worse pain, disability, and mental health. Furthermore, longitudinal observational studies have reported that patients treated with opioids have poorer functional outcomes than those not treated with opioids. These observations have led to concerns that patients receiving opioid therapy may be resistant to pain management or that opioids may interfere with treatment response. We conducted a secondary analysis of data from the Stepped Care to Optimize Pain Care Effectiveness (SCOPE) randomized trial, which compared a telephone-based collaborative analgesic optimization intervention to usual care over 12 months. Our objectives were to 1) characterize factors associated with baseline opioid use among SCOPE participants and 2) determine whether baseline opioid use predicted pain outcomes. We hypothesized that participants with baseline opioid use would have worse pain, disability, and mental health comorbidity at baseline and that baseline opioid use would predict worse pain outcomes over 12 months.

METHODS: SCOPE participants were 250 VA primary care patients with chronic musculoskeletal pain of at least moderate severity. Participants were randomized to either intervention or usual care. Those assigned to the intervention group received 12 months of automated symptom monitoring, telephone-based nurse care management, and algorithm-guided analgesic optimization. Analgesic optimization focused primarily on active adjustment of non-opioid medications. The intensity of opioid therapy remained stable over the course of the trial. The primary trial outcome was the total score (0 to 10) on the Brief Pain Inventory (BPI), which assesses pain intensity and functional interference. For this analysis, we used chi-square and t-tests to conduct unadjusted comparisons between opioid users and non-users at baseline. We used multivariable logistic regression to examine cross-sectional associations with baseline opioid use; the model included variables that were theoretically related to opioid use or associated at the $p \leq 0.2$ level in unadjusted comparisons. Finally, we used mixed-effect models for repeated measures

(MMRM) to examine baseline opioid use as a predictor of the primary pain outcome (i.e., BPI score).

RESULTS: At baseline, 84 (33.6 %) trial participants reported use of prescribed opioid analgesics. In unadjusted comparisons, opioid users had worse baseline BPI total scores (6.2 vs. 4.7), more painful sites (5.5 vs. 4.6), and more medical comorbidities (2.3 vs. 1.9) than non-users. They were also less likely to be employed (52.4 vs. 69.9 %), more likely to have depression (42.9 vs. 14.5 %), more likely to smoke (35.7 vs. 19.9 %), and more likely to have high disability days in the past month (53.6 vs. 21.1 %). In the multivariable model examining baseline associations, only baseline pain ($p = 0.006$) and disability days ($p = 0.036$) were independently associated with baseline opioid use. In the model examining predictors of outcomes over 12 months, which included baseline BPI, treatment group assignment, disability days, depression, and smoking, there was no statistically significant effect of baseline opioid use ($p = 0.98$) on BPI score. In contrast, treatment group assignment, baseline BPI, and time were all significant predictors of BPI over 12 months. A test for interaction between baseline opioid use and treatment group assignment was not statistically significant ($p = 0.95$).

CONCLUSIONS: In this analysis of data from a randomized controlled trial of telecare collaborative pain management, we found that baseline opioid use did not predict the primary pain outcome and did not modify the intervention's beneficial effect on pain. Results of our cross-sectional analyses were consistent with prior studies, showing that patients receiving opioid therapy at baseline had worse baseline pain, disability, and mental health than patients not receiving opioid therapy; in the adjusted model, pain and disability were independently associated with opioid use. We are encouraged by our finding that response to the collaborative pain management intervention was not significantly affected by pre-existing opioid therapy. Although patients on opioids were more distressed at baseline, they benefited from a relatively low-intensity telephone-based intervention involving symptom monitoring and optimization of primarily non-opioid analgesics. Given growing concerns about harms of long-term and high-dose opioid therapy, future research should examine whether a modified collaborative management protocol could be an effective strategy to achieve dual goals of improving pain outcomes and reducing intensity of opioid therapy.

BRIEF COMMUNICATION CURRICULUM IMPROVES DISCHARGE SUMMARY QUALITY Valerie Perel¹; Adam Carrington²; Michael Janjigian⁴; Verity Schaye²; Rachel Shur²; Jessica Taft³; Ellen Wagner²; David Wei²; Meng Yang⁵; Lisa Altschuler². ¹NYU Department of Internal Medicine, New York, NY; ²NYU School of Medicine, New York, NY; ³New York University, New York, NY; ⁴New York University School of Medicine, New York, NY; ⁵Columbia University Mailman School of Public Health, New York, NY. (Tracking ID #2198189)

BACKGROUND: Good written communication is essential to maintaining continuity of care across transitions and minimizing adverse outcomes. Written discharge summaries (DCS) are the main mechanism for communication between hospital providers and those caring for the patient after discharge. Short-cuts such as "cut and paste" that are often used to save time when writing notes can lead to poor quality documentation. Improvements in DCS have been shown to reduce patient medication errors and other adverse events. To improve the quality of written communication at our institution, we provide interns and residents on a specialized inpatient ward rotation (Bedside Skills Team (BST)) a session on both written and verbal communication skills. This study examined the impact of this rotation on the quality of DCS.

METHODS: This study assessed DCS written by 48 Internal Medicine interns at an urban safety-net hospital who were rotating on the BST or a general ward team when they wrote the DCS (21 intervention, 27 control). Four to five DCS per intern written during the rotation were selected for review (102 intervention, 111 control). The intervention group received a one-hour session on note writing reviewing standardized note formats and previous notes they had written. The interns continued to receive feedback on their notes throughout the 2 week rotation by their attending and resident. A rating scale to assess the quality of summaries was developed based on Joint Commission standards and expert consensus. The initial scale consisted of 15 items but was reduced to 11 in order to achieve suitable internal consistency. Four items were rated as present or not present and seven quality items were scored on a three-point Likert scale for a total possible summary score ranging from 4 to 24. Each item had specific descriptors for each anchor point. Coding was done by four experienced physicians blinded to group status. Inter-rater reliability was established by having the four raters rate two DCS that another rater had also rated (kappa .77). 20 % of charts were scored by all four raters and reviewed as a group to standardize rating system and establish consensus. Two sample t-tests were computed on the summary score as well as on individual items to assess impact of the rotation.

RESULTS: Mean DCS score for the intervention group was 20.8 (SD 4.2) and for the control group was 17.5 (SD 4.2) with a significant mean difference of 3.3 ($p = 0.0002$), with a Cohen's d of 0.78 (large effect size). Interns in the intervention group were less likely than control interns to inappropriately copy and paste information (39 vs 74 %

respectively, $p < 0.001$). Intervention interns were more likely than control interns to chronologically document the History of Present Illness and to clearly list consults and procedures from the hospitalization.

CONCLUSIONS: Interns who engaged in a 2-week rotation with a focus on written and oral communication skills wrote higher quality DCSs compared to trainees who had not received the rotation. In particular, interns in the intervention group produced a more

organized, concise and chronological history of present illness, and better described the consultations and procedures completed during the hospital stay. The control group was twice as likely to show evidence of inappropriate copying and pasting of information. Both groups had room for improvement in important patient safety areas (e.g., deficits in medication reconciliation) that need continued focus during resident training. Futures studies should focus on durability of communication skills following a brief intervention.

	Intervention	Control
Medication list matches home medication list	67%	57%
Recommendations for next provider by problem list	87%	69%
Identification of next provider by name or type of provider	89%	85%
No evidence of inappropriate copy and paste*	61%	25%

* $p < 0.001$

	Intervention			Control		
	Well Done	Partially Done	Not Done	Well Done	Partially Done	Not Done
History of Present Illness*	64%	17%	19%	21%	39%	40%
Hospital Course	75%	16%	9%	49%	24%	27%
Hospital Consults*	70%	16%	14%	22%	51%	27%
Hospital Procedures*	75%	12%	13%	24%	45%	31%
Specific follow-up appointment set up	23%	36%	41%	29%	31%	39%
Information sufficient for outpatient management	82%	16%	4%	80%	15%	5%
Information sufficient for readmission management	83%	13%	3%	82%	15%	3%

* $p < 0.001$

Results by item.

CARDIAC VALVE DISEASE IN ADULTS WITH DOWN SYNDROME Kristin M. Jensen¹; Laura A. Seewald¹; Molly Levitt¹; Edward R. McCabe²; Francis J. Hickey³; Jeremy R. Nicolarsen^{3, 4}; Joseph Kay^{4, 3}; Amber Khanna^{4, 3}. ¹University of Colorado School of Medicine, Aurora, CO; ²March of Dimes Foundation, White Plains, NY; ³Children's Hospital Colorado, Aurora, CO; ⁴University of Colorado Hospital, Aurora, CO. (Tracking ID #2192787)

BACKGROUND: The care of adults with Down syndrome (DS) is an emerging field, due to the fact that few persons with DS survived past adolescence until the 1980s. As such, evidence to guide providers of the adult DS population has lagged behind the pediatric population. Children with DS have high rates of congenital heart disease (CHD) with prevalence estimates of 40–60 %. However, case reports in the 1980s–1990s suggest additional risk for acquired valve disease in adults with DS, regardless of their congenital heart disease status. To date, routine echocardiographic screening of adults with DS has not been adopted by the field of Cardiology, likely due to the small size and lack of controls in those early reports. In this study, we sought to systematically evaluate the prevalence of valve disease in adults with DS compared to non-DS adults undergoing echocardiogram for purposes other than known valve disease.

METHODS: We conducted a retrospective chart review from 2006 to 2012 of all persons ages 16–65 years with DS who underwent an echocardiogram at our institution. Controls were randomly identified at ratios of 2.5 controls: 1 case from all persons ages 18–65 years old who underwent an echocardiogram for complaints of syncope or palpitations. Stress and pregnancy echocardiograms were excluded from our analysis. We defined valve disease as the presence of moderate or severe valve disease on echocardiogram. Comparisons were made using t-tests and Pearson's chi-squared tests as appropriate.

RESULTS: From 2006 to 2012, 81 adults with DS underwent echocardiography at our institution. Compared to non-DS controls ($n = 225$), adults with DS were younger at the time of their echocardiogram (median age at echocardiogram: DS 30.0y, nonDS 46.0y, $p < 0.001$) with higher rates of congenital heart disease (DS 73 %, nonDS 19 %, $p < 0.001$). Twenty-eight percent of adults with DS had echocardiographic findings of moderate to severe valve disease vs. 14 % of the non-DS population ($p = 0.003$). In subgroup analysis, we observed valve disease in 14 % of persons with DS and 11 % of persons without DS who did not also have a history of CHD and thus would qualify as truly acquired valve disease ($p = 0.452$). No differences were found in rates or pathology of valve disease among persons with CHD history regardless of DS status. There were no differences in rates of congestive heart failure, oxygen use, or valve repair between our cohorts. Eisenmenger's syndrome was seen exclusively in the DS cohort (DS 2.5 %, nonDS 0 %, $p = 0.018$).

CONCLUSIONS: In this single center retrospective cohort study, we observed valve disease in DS patients both with and without a history of CHD. This indicates that the cardiac history of persons with DS continues to evolve beyond their initial CHD status and suggests the need to adapt recommendations for adults with DS to include screening for acquired valve disease in addition to following for sequelae of their CHD.

CHANGES IN HOSPITALIZED ANEMIC PATIENTS' FATIGUE WITH RED BLOOD CELL TRANSFUSIONS Micah T. Prochaska; Richard Newcomb; Andrea Flores; Tamar Polonsky; Andrew Artz; Caitlin Phillips; Sarah Follman; David Meltzer. University of Chicago, Chicago, IL. (Tracking ID #2199099)

BACKGROUND: The current AABB guidelines recommend transfusing red blood cells in hospitalized patients at "restrictive" hemoglobin (Hb) concentrations and for symptoms of anemia. However, studies incorporating objective patient symptoms into transfusion

decisions are lacking. Therefore, we sought to measure how anemia related fatigue changes from hospitalization to 30 days post-discharge and whether baseline (in-hospital) Hb and receipt of red blood cell transfusions are associated with changes in fatigue.

METHODS: From May-December 2014, all hospitalized general medicine patients at a single urban academic medical center with Hb<9 g/dL, were approached for an in-person interview while in the hospital and a 30-day post-discharge phone interview. The Functional Assessment of Cancer Therapy Fatigue Subscale (FACIT) was used to measure fatigue at both times. FACIT scores range from 0 to 52, with lower scores reflecting greater symptoms of fatigue, and score differences of 3 reflect the minimum for a clinically important difference. A "change in fatigue" score was calculated by subtracting responses on the FACIT while hospitalized from responses on the FACIT at the interview 30-days post discharge. Positive change in fatigue scores represented decreased (or improved) fatigue from hospital to 30 days post-discharge. Patients with baseline FACIT scores <31 were considered to have "high" baseline fatigue. Patients' Hb level and number of transfusions received while in the hospital were assessed by chart review. Linear regression was used to test associations between "change in fatigue" score, baseline Hb concentration, and receipt of a transfusion.

RESULTS: Two hundred seventy-four patients completed the inpatient and follow up interview. The median age of participants was 58, with 61 % female, and 69 % African American. There were no significant differences in these demographics between those who were transfused versus those who were not transfused [(median age 58 vs. 55; $p=0.33$), (percent female 60 vs. 61 %; $p=0.84$), (African American 69 vs. 69 %; $p=0.54$). There were also no significant differences in comorbidities between those who were transfused versus those who were not transfused [(cancer 18 vs. 14 %; $p=0.69$), (diabetes 28 vs. 39 %; $p=0.21$), (heart failure 28 vs. 25 %; $p=0.87$), (chronic kidney disease 22 vs. 35 %; $p=0.08$)]. Baseline FACIT score was 27 in those transfused and was 27 in those not transfused ($p=0.87$). Among patients with baseline high levels of fatigue and a Hb<8 g/dL, those receiving a transfusion had a clinically significant improvement in fatigue compared to non-transfused patients (median change in fatigue, transfused 16 vs. non-transfused group 6.75; $p=0.007$) (Fig 1). Among patients with high levels of fatigue and a Hb>8 g/dL, those receiving a transfusion also had improved fatigue compared to patients not transfused, although the difference was not statistically significant (median change in fatigue, transfused 10.8 vs. non-transfused group 9.45; $p=0.66$). Among patients with low levels of fatigue (FACIT score >31) irrespective of Hb level, no significant difference in change in fatigue was found between those transfused and those not transfused.

CONCLUSIONS: These findings are consistent with the hypothesis that blood transfusions may improve fatigue in hospitalized anemic patients, specifically those with high levels of pre-transfusion fatigue. This suggests that inpatient providers may be able to combine self-reported fatigue in patients and their Hb concentration to better target those most likely to benefit symptomatically from a transfusion, while avoiding transfusions and attendant complications in other patients. Prospective studies are warranted to identify the effects of a symptom-guided transfusion strategy on other symptoms of anemia, such as functional capacity, as well as to evaluate other outcomes of hospitalized patients with anemia.

CHANGING THE CULTURE OF BEDSIDE TEACHING: MASTER CLINICIAN AND JUNIOR FACULTY PARTNERSHIP Lisa Altshuler², Douglas Bails¹, Adam Carrington², Patrick M. Cocks³, Danise Schiliro⁴, Verity Schaye², Ellen Wagner², Sondra Zabar², Michael Janjigian². ¹Bellevue Hospital Center, New York, NY; ²NYU School of Medicine, New York, NY; ³NYU School of medicine, New York, NY; ⁴Yale-Waterbury Internal Medicine Residency Program, Waterbury, CT. (Tracking ID #2197740)

BACKGROUND: We developed a 2-week ward rotation at an urban safety net teaching hospital with a focus on bedside teaching to improve physical examination, communication, and clinical reasoning skills in both house staff and faculty. Highly regarded clinical teachers, deemed "master clinicians" by their peers, lead morning sessions with a focus on clinical reasoning and afternoon sessions on physical diagnosis skills at the bedside. The ward attending physician supervises patient care and participates in all educational activities. While bedside teaching is a powerful teaching strategy, barriers to implementation include time constraints, concerns about patient comfort, and lack of confidence on part of faculty. This qualitative study evaluates how attending faculty perceive the benefit of such a teaching service, and the impact of clinical reasoning and physical exam sessions on their own methods of teaching.

METHODS: We conducted focus groups or structured interviews with 12 of the 18 faculty who served as attendings on this rotation from July 2012-June 2013, including seven females and one male. One attending had 20 years experience, with the remainder ranging from 2 to 10 years experience. Faculty were asked about their perceptions of the rotation and how it differed from other inpatient ward rotations, their participation in the teaching sessions, and the impact of the rotation on their own teaching. The interview was transcribed and imported into qualitative analysis software (dedoose) for analysis. A

grounded theory analysis was used to develop and link thematic cues describing the responses. All data was read and coded by three independent readers.

RESULTS: The focus group highlighted the value of bedside rounds as an effective teaching method. Bedside teaching reinforced key concepts in physical examination and clinical reasoning and provided opportunities for evaluation of trainee performance. With respect to their own professional development, faculty found it "very helpful" to observe master clinicians demonstrating physical exam techniques and explaining their clinical reasoning because as junior faculty they "don't ever really get to do that". Many faculty reported teaching the physical exam skills that they learned during these bedside sessions and increasing the frequency of bedside teaching. One attending reported "...only if I'm going to the bedside with some expert teachers did I realize how much value there is in going to the bedside." Another noted, "it let me focus on the skills that I had deficits in. And then I would get to learn those deficits and then re teach what I learned back to the residents and the interns." Faculty reported integrating teaching skills modeled from the master clinician sessions, including how to effectively engage learners in clinical reasoning and physical exam sessions and how to assess their clinical reasoning. They valued observing different teaching styles from "expert teachers". As one faculty member noted, "I definitely learned... how to think on your feet and how to approach a case presentation. How to lead a team through a case."

CONCLUSIONS: This 2-week inpatient rotation is an effective way to partner junior faculty and master clinicians in order to teach clinical reasoning and physical exam skills. This partnership has been effective in overcoming barriers to bedside teaching by improving confidence in physical exam skills and providing a framework for effective teaching. The range of master clinician teaching styles enables junior faculty to adopt teaching strategies that play to their strengths. We have created an effective faculty development program by enhancing a mandatory ward rotation with teaching of clinical reasoning and physical exam skills by master clinicians.

CONTINUITY OF CARE BETWEEN MENTAL HEALTH AND PRIMARY CARE PROVIDERS AFTER A MENTAL HEALTH CONSULTATION. Ben Colaiaco³, Carol Roth⁴, David Ganz^{1, 5}, Mark Hanson³, Patty Smith³, Neil Wenger^{2, 3}. ¹RAND Corporation, Santa Monica, CA; ²University of California, Los Angeles, Los Angeles, CA; ³RAND Health, Santa Monica, CA; ⁴RAND, Santa Monica, CA; ⁵GLAVA, Los Angeles, CA. (Tracking ID #2198037)

BACKGROUND: Continuity between mental health providers (MHPs) and primary care providers (PCPs) is important to coordinate care for persons with mental illness. Lack of continuity can lead to therapeutic failure and dangerous drug interactions. Efforts have been undertaken to enhance communication, but the level of continuity in community practice has not been rigorously studied. We evaluated communication between MHPs seeing a patient for a new consult and PCPs, and compared continuity among providers sharing a mutual access electronic health record (EHR), and continuity among providers not sharing an EHR.

METHODS: Medicare Advantage enrollees with a new outpatient mental health consultation in 2012 were randomly selected within six geographically diverse health plans. Patients had no mental health visits in 2011 and an outpatient mental health consult, as well as at least 1 PCP visit, in 2012. Plans endeavored to retrieve medical records from MHPs and PCPs. Among patients for whom MHP and PCP records were obtained, charts were abstracted for information about the mental health consultation in the PCP record, evidence of documented continuity with the PCP about mental health hospital admissions and emergency department visits, and acknowledgement in the PCP record of psychotropic medications noted in the mental health record. These measures were compared between patients whose providers used and did not use a mutual access EHR.

RESULTS: For 141 (65 %) of 216 patients, plans were able to retrieve both MHP and PCP records. Records could not be retrieved from MHPs for 45 patients, from PCPs for 13 patients, and from neither MHPs nor PCPs for 17 patients. The 141 patients had a mean of 4.2 mental health visits (range 1-30) and a mean of 5.5 primary care visits (range 1-20) in 2012. Thirty (21 %) patients had PCP medical record documentation of communication from the MHP within 3 months of the consultation. Among these 30 patients, for 8 patients there was evidence of a telephone call, e-mail or other correspondence between MHP and PCP, for 4 there was an indication of a plan for, or attempt at, a telephone call, for 11 there was a mental health consultation note or report in the primary care record, and for 10 patients in systems with a mutual access EHR, the PCP reviewed the mental health note within the record. The PCP medical record revealed evidence of timely communication about 11 of 26 (42 %) mental health admissions and emergency department visits. Seventy-eight of the 141 patients were receiving 152 psychotropic medications according to the MHP record during the study interval. For 103 (68 %) of those medications, there was acknowledgement in the PCP record of the medication (or for cases with a mutual access EHR, the medication list that included psychotropic medications was accessed by the PCP at the follow up visit). Evaluating only the 126 medications of the 54 patients whose physicians did not use a mutual access EHR, half of the psychotropic medications

were antidepressants, 27 % were benzodiazepines and hypnotics, and 10 % were antipsychotics. Information discontinuity between the MHP and PCP records was found for 7 of 15 antipsychotic medications and 13 of 34 hypnotic/benzodiazepine medications. PCPs who shared a mutual access EHR with MHPs more often had access to mental health consult information (46 % v 11 %, $p<0.001$) and information about psychotropic medication use (100 % v 56 %, $p<0.001$).

CONCLUSIONS: This small, but detailed, study of patients receiving new outpatient mental health consults shows poor care continuity between MHPs and PCPs. Furthermore, evaluation of continuity between MHPs and PCPs is difficult for Medicare Advantage plans because of lack of mental health record accessibility. A mutual access EHR might mitigate discontinuity between mental health and primary care.

COST-EFFECTIVENESS OF HERPES ZOSTER (SHINGLES) VACCINE FOR PEOPLE AGED 50 YEARS Phuc H. Le; Michael B. Rothberg. Cleveland Clinic, Cleveland, OH. (Tracking ID #2192780)

BACKGROUND: Herpes zoster (HZ) affects approximately 30 % of the general population over their lifetime. Both the incidence and severity of HZ increase with age. The zoster vaccine can prevent HZ and postherpetic neuralgia (PHN), and is licensed for use among people aged ≥ 50 years. However, the Advisory Committee on Immunization Practices recommends the vaccine for people aged ≥ 60 years only. To inform the decision making process, this study aimed to analyze the cost-effectiveness of HZ vaccine versus no vaccine for immunocompetent adults aged 50 years.

METHODS: We employed a previously published Markov decision model and updated the inputs relevant for people aged 50–59 years. The entire cohort entered the model in the ‘Healthy’ state at age 50; then moved between health states with transition probabilities for a life-long time horizon. The model considered cases of HZ, PHN, and other complications of HZ including ophthalmic and otic complications, hospitalization and death. Compared to the unvaccinated group, the vaccinated group had reduced disease incidence and complications proportional to vaccine efficacy. Model inputs were derived primarily from US-based studies to reflect the epidemiology, utilities, and quality-adjusted life years (QALYs) of a general US population. Vaccine efficacy was based on the Zostavax Efficacy and Safety Trial, and duration of efficacy on the Long-Term Persistence Substudy, which reported 11 years of follow up from the Shingles Prevention Study. Costs were drawn from the medical literature. They included both direct medical costs and indirect costs due to lost productivity, expressed in 2014 US dollars (\$) adjusted for inflation. Outcomes included costs and effectiveness (the number of HZ cases, PHN cases, and QALYs) for each strategy. Results were presented as incremental cost-effectiveness ratio (ICER) per QALY saved. The study was conducted from the societal perspective, with both costs and QALYs discounted at 3 % per year. In addition to deterministic sensitivity analysis, probabilistic sensitivity analysis was also conducted, in which all variables were varied simultaneously; 10,000 Monte Carlo iterations were performed.

RESULTS: In the base case, for every 1000 persons vaccinated, 25 HZ cases and one PHN case would be prevented, equivalent to 0.4 QALYs saved at a cost of \$134,000 (\$318,071/QALY saved). Because HZ incidences were higher in women, the ICER was half as much for women as for men. In deterministic sensitivity analysis, only changes in vaccine cost resulted in an ICER of $< \$100,000/\text{QALY}$ (at \$82/dose) (Figure 1). In probabilistic sensitivity analysis, the mean ICER was \$422,112/QALY (95 % CI \$17,814–\$1,438,991/QALY). At a willingness-to-pay threshold of \$100,000/QALY, the vaccine was cost-effective in 11 % of iterations.

CONCLUSIONS: Although HZ vaccine is efficacious in protecting people aged 50–59 years, it does not appear to represent good value for this group.

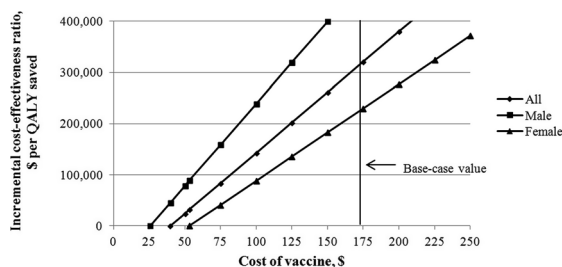


Figure 1: Incremental costs per quality-adjusted life year (QALY) saved of the herpes zoster vaccination program as a function of vaccine cost.

DEPRESSION CARE MANAGEMENT AMONG U.S. MEDICAL GROUPS Tara F. Bishop²; Patricia Ramsay³; Lawrence P. Casalino²; Shortell Stephen¹. ¹UC Berkeley, Berkeley, CA; ²Weill Cornell Medical College, New York, NY; ³University of California Berkeley, Berkeley, CA. (Tracking ID #2197973)

BACKGROUND: The Centers for Disease Control and Prevention (CDC) estimates that 6.8 to 8.7 % of the U.S. adult population suffers from depression at any given time. Primary care physicians play an important role in the diagnosis and management of depression. It is unclear whether primary care practices are well-equipped to manage depression as a chronic illness. To assess whether primary care practices are well-equipped to manage depression as a chronic illness, we analyzed data from the largest national survey of physician practice to answer three research questions: 1) what care management processes (CMPs) do practices use for patients with depression, 2) are the rates of use of CMPs for depression lower than for other chronic illnesses and 3) what practice characteristics correlate with high depression CMP use.

METHODS: We used data from the largest national survey of physician practices in the U.S.—the National Survey of Physician Organizations 3. The survey was a 40-min telephone survey with medical directors, presidents, or chief executive officers of the medical groups in the U.S. and focused on the use of care management processes particularly for patients with depression, asthma, diabetes, and congestive heart failure. For this study, we selected practices that were all primary care (general internists, family practitioners, and general practitioners) or multi-specialty which we defined as practices with between 33 and 99 % primary care physicians yielding. Data were collected in 2012 and 2013. The primary outcome was a CMP index for depression, asthma, diabetes, and congestive heart failure which ranged from 0 to 5 based on a practice's response to the individual components. We calculated the percentage of practices that used each CMP for patients with depression, asthma, diabetes, and congestive heart failure and the mean CMP score for each of these conditions. We used multivariable logistic regression to explore associations between practice characteristics and high depression CMP scores (≥ 3).

RESULTS: A total of 1070 practices were included in the analysis. The mean practice size was 21 physicians and 81 % of the practices were all primary care physicians. Practices had been in existence a mean of 21 years. The mean CMP scores for depression (0.82, SE 0.02) were lower than the mean CMP scores for asthma (1.13, SE 0.07), congestive heart failure (1.13, SE 0.07), and diabetes (1.74, SE 0.13). In the multivariable model, practices with high depression CMP scores were more likely to be larger (adjusted odds ratio [aOR] 0.98, $p=0.008$), in the South (aOR 4.15 compared with the Northeast, $p<0.001$), have higher pay-for-performance indices (aOR 1.71, $p=0.02$), have higher public reporting indices (aOR 1.36, $p=0.02$), have higher use of CMPs for other conditions (aOR 2.45, $p=0.0002$), and have higher health information technology indices (aOR 1.06, $p=0.01$). Practices that were owned by hospitals were less likely to have high depression CMP scores (aOR 0.46, $p=0.06$ compared with physician-owned practices) as were practices in the West (aOR 0.18, $p<0.001$ compared with the Northeast) and the Midwest (aOR 0.53, $p=0.08$).

CONCLUSIONS: In this national survey of physician groups, the use of CMPs for depression in primary care practices was less than the use of CMPs for other chronic medical conditions. Our analysis also revealed regional variation in the use of CMPs for depression. Practices that had more incentives in place to improve quality and used CMPs for other conditions were more likely to have higher depression CMP scores. Our findings highlight the underuse of evidence-based CMPs for depression in U.S. primary care practices which may limit both access to and quality of depression care in the U.S.

EDUCATIONAL LEVEL, ANTICOAGULATION QUALITY, AND CLINICAL OUTCOMES IN PATIENTS WITH ACUTE VENOUS THROMBOEMBOLISM

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BACKGROUND: Previous studies have demonstrated an association between a lower educational level and an increased risk for venous thromboembolism (VTE). However, whether the educational level is associated with anticoagulation quality and clinical outcomes in patients with acute VTE is unknown.

METHODS: We studied 817 patients aged ≥ 65 years with acute VTE from a Swiss prospective multicenter cohort study between September 2009 and December 2013. We defined three educational levels: 1) less than high school (≤ 9 years of education), 2) high school, or 3) post-secondary (diploma from a university or an equivalent institution). The primary outcome was the quality of anticoagulation, expressed as the percentage of time in therapeutic INR range (2.0–3.0). Secondary outcomes were the time to a first fatal or non-fatal recurrent VTE, and the time to a first fatal or non-fatal major bleeding. We examined the association between educational level and outcomes using linear and competing risk regression, adjusting for patient baseline characteristics and treatments, including periods of anticoagulation as a time-varying covariate.

RESULTS: Overall, 56 % of patients had a less than high school, 25 % a high school, and 19 % a post-secondary educational level. The median time spent in the therapeutic INR range was 64 % for patients with less than high school, 68 % for patients with high school, and 65 % for patients with a post-secondary educational level ($P=0.27$). After adjustment, we found no association between educational level and time in the therapeutic INR range. Furthermore, there was no association between educational level and recurrent VTE or major bleeding (Table).

CONCLUSIONS: In our prospective multicenter cohort, we did not find an association between educational level and anticoagulation quality or medical outcomes in patients with acute VTE.

Association between educational level and medical outcomes

Educational level	Adjusted sub-hazard ratio (95 % confidence interval)
Recurrent venous thromboembolism	
Less than high school	—
High school	0.97 (0.58–1.65)
Post-secondary	1.16 (0.69–1.96)
Major bleeding	
Less than high school	—
High school	1.13 (0.70–1.82)
Post-secondary	1.40 (0.82–2.38)

EFFECT OF A PHARMACIST COUNSELING INTERVENTION ON HEALTHCARE UTILIZATION AFTER HOSPITAL DISCHARGE: A RANDOMIZED CONTROLLED TRIAL Susan P. Bell³; Jeffrey L. Schnipper¹; Kathryn Goggins³; Aihua Bian³; Ayumi Shintani³; Christianne Roumie³; anuj dalal¹; terry jacobson³; Kim Rask⁴; Viola Vaccarino⁴; tejah gandhi¹; Stephanie Labonville¹; Daniel Johnson²; Erin Neal²; Sunil Kripalani³. ¹Brigham and Women, Boston, MA; ²Vanderbilt University Medical Center, Nashville, TN; ³Vanderbilt University, Nashville, TN; ⁴Emory, Atlanta, GA. (Tracking ID #2201028)

BACKGROUND: Reduction in 30 day readmission rates following hospitalization for acute coronary syndrome (ACS) and acute decompensated heart failure (ADHF) is a national goal. We sought to determine the effect of a tailored, pharmacist-delivered, health literacy intervention on time to first hospital readmission or Emergency Department (ED) visit following discharge.

METHODS: The Pharmacist Intervention for Low Literacy in Cardiovascular Disease (PILLCVD) study enrolled adults at two tertiary care academic centers between May 2008 and September 2009 with a diagnosis of ACS and/or ADHF. Participants were randomized to intervention or standard of care in a 1:1 ratio by concealed allocation, and outcomes were assessed by blinded researchers. The intervention group received pharmacist-assisted medication reconciliation, inpatient pharmacist counseling, and low literacy adherence aids while hospitalized, and individualized telephone followup calls after discharge. A Cox proportional hazard model was constructed to assess the effect of the intervention on time to first ED visit or unplanned rehospitalization during the 30 days after discharge. The multivariable analysis controlled for age, sex, race, marital status, health literacy, cognition, prior hospitalizations, and length of stay. Prespecified secondary analyses were performed to assess the differential effects of the intervention by site, health literacy, and cognition.

RESULTS: Among the 851 participants enrolled at Vanderbilt University Hospital (VUH) and Brigham and Women's Hospital (BWH), 10 % of patients had inadequate health literacy, and 12 % had impaired cognition. Overall, the intervention and control groups did not differ significantly in their 30 day rate of ED visits (21.8 vs. 20.2 %, respectively) or unplanned readmissions (15.0 vs. 15.8 %). In the primary, adjusted analysis, the intervention did not show a significant effect overall on time to first unplanned hospital readmission or ED visit (HR=1.04, 95 % CI 0.78, 1.39). Stratified analysis by site demonstrated a more beneficial effect at VUH as compared to BWH ($P=0.039$). Among patients with inadequate health literacy, the intervention significantly improved the primary outcome, with a longer time to first unplanned hospital readmission or ED visit compared to usual care (HR=0.41, 95 % CI 0.17, 1.00). There was no differential effect of the intervention by cognition.

CONCLUSIONS: A tailored, pharmacist-delivered medication safety intervention did not demonstrate an overall beneficial effect on time to first unplanned health care utilization after hospital discharge. Individuals with inadequate health literacy, however, did appear to benefit, suggesting targeted practice of pharmacist intervention in this population may reduce 30 day unplanned health care utilization.

EFFECT OF FAMILY HISTORY AND GENETIC RISK COUNSELLING FOR TYPE 2 DIABETES ON PERCEPTIONS OF RISK AND CONTROL: SECONDARY ANALYSIS OF A RANDOMIZED CONTROLLED TRIAL R. R. Wu^{2, 1}; Tiffany Himmel²; Rachel A. Myers²; Elizabeth Hauser²; Allison Vorderstrasse²; Geoffrey Ginsburg²; Lori A. Orlando². ¹VA Health System, Durham, NC; ²Duke University, Durham, NC. (Tracking ID #2198114)

BACKGROUND: Family health history (FHH) based risk assessment has been shown to increase perceived risk of disease and affect behavior change. Incorporating genetic testing as part of a risk assessment (either alone or in combination with FHH) has the potential to further refine patient and provider understanding of individual risk and improve collaborative efforts to manage that risk. To understand the additive impact of genetic risk assessment, we performed a secondary analysis to determine the effect of personalized risk counselling for Type 2 Diabetes (T2D), with incorporation of FHH and genetic risk counselling, on risk perception and perception of control, two cognitive precursors of behavior change.

METHODS: A convenience sample of non-diabetic patients from two primary care clinics was recruited while awaiting bloodwork. Subjects were randomized to receive traditional risk counselling including FHH with or without the incorporation of genetic test results of SNP-based testing of four genes (i.e. eight alleles) known to be associated with T2D. FHH risk was categorized based on published algorithms and explained to subjects as average, moderate, or high. Genetic results were provided as total positive alleles out of the maximum of 8. Surveys were completed at baseline and post-counselling at 3 and 12 months to assess perceptions of overall disease risk and genetic risk for T2D using questions derived from the Common Sense Model and control over disease development using questions from the Illness Perception Questionnaire. Primary outcomes have already been reported.

RESULTS: Participants who completed the study (invited=1416, enrolled=409, completed=321) were 69 % female (64 % Caucasian, 24 % black, and 12 % other). The mean age was 52. There was a reasonable distribution of participants in each of the FHH risk categories (average=143, moderate=84, high=94), and the mean number of high risk alleles for the study population was 4.99 (SD 1.22, range 2–7.) FHH risk category and number of high risk alleles were correlated. Subjects with average FHH had a mean of 4.76 alleles, moderate FHH had a mean of 4.79 alleles, and high FHH subjects had a mean of 5.18 alleles (p -value=0.03). Higher FHH risk level was associated with higher perceptions of overall risk of disease development across all time points (all p -values<0.001) and did not change over time as a result of risk counselling. In addition perception of genetic risk for disease was correlated with FHH risk category (all p -values<0.001) across all time points and was not affected by the counselling session. In regards to genetic testing, number of positive alleles did not influence perception of overall disease development risk at any time point. However having an increased number of alleles did lead to a change in perception of genetic risk from pre- to post-counselling (more risk: 5.21 alleles, same risk: 5.06 alleles, less risk: 4.44 alleles, ANOVA p -value=0.007). When stratified by FHH risk category, this effect was most strongly seen in those with FHH risk that was average (p -value=0.04) or moderate (p -value=0.005) with no effect in the high FHH risk category (p -value=0.46). (Table) Perception of control over risk of disease development was high overall (mean 24.08, SD 3.43, possible range 0–25) and not affected by FHH or genetic risk.

CONCLUSIONS: Patients have a strong sense of personal control over diabetes development. There was a strong understanding of the relationship of FHH to their overall risk of disease and perceptions of their genetic risk. A higher number of genetic risk alleles did not correlate with perception of overall disease risk but did have an effect on perceptions of genetic risk. Strongest effects were seen among those with an average or moderate FHH risk level. As genetic testing for risk prediction becomes more main stream, further work should be done to understand who most benefits from testing and optimal methods for delivery of that information to optimize behavior change and risk reduction.

Mean genetic allele number stratified by FHH risk category effect on change in perception of genetic risk over time

	Increased Risk		Same Risk		Decreased Risk		Overall	
	Mean (SD)	N (%)	Mean (SD)	N (%)	Mean (SD)	N (%)	Mean (SD)	N (%)
Average FHH*	5.08 (1.18)	36 (55)	4.90 (1.37)	20 (31)	3.89 (1.17)	9 (14)	4.86 (1.29)	65 (100)
Moderate FHH**	5.44 (0.78)	18 (42)	5.69 (0.95)	13 (30)	4.50 (1.00)	12 (28)	5.26 (1.00)	43 (100)
High FHH***	5.25 (1.18)	16 (33)	4.76 (1.03)	17 (35)	4.73 (1.67)	15 (31)	4.92 (1.30)	48 (100)

*ANOVA p -value=0.04; **ANOVA p -value=0.005; *** ANOVA p -value=0.46

ELECTRONIC MEDICAL RECORD BASED INTERVENTION TO REDUCE LENGTH OF STAY FOR VETERANS HOSPITALIZED WITH PNEUMONIA

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BACKGROUND: There are more than 1.2 million hospitalizations for pneumonia each year in the United States. Although there has been considerable focus on improving pneumonia-related process of care measures, such as use of guideline concordant antibiotics, there has been much less attention paid to reducing length of hospital stay. Therefore we conducted a pre-post intervention trial of a electronic medical record (EMR) based clinical reminder to identify when patients with pneumonia were clinically stable and ready for conversion from IV to oral antibiotics.

METHODS: We conducted this study at a single Department of Veterans Affairs hospital. We developed an EMR-based inpatient clinical reminder to assist physicians with appropriate conversion from IV to oral antibiotics and that encouraged discharge on the same day unless there were other social problems or unstable comorbid conditions. We implemented this reminder with academic detailing on February 1, 2011. We then compared patients hospitalized in April/May 2010 (pre) to patients hospitalized in April/May 2011 (post).

RESULTS: There were 66 patients in the pre-intervention period and 63 patients in the post-intervention period. There were no statistically significant differences in characteristics between the pre- and post-intervention groups. Overall, mean age was 69.7 years, 96 % were male, and 29 % were in the ICU during part of their stay. Regarding pneumonia severity index, 28 % were classes I–III, 46 % were class IV, and 26 % were class V. Mortality within 30-days was 3.0 % in the pre-intervention and 3.2 % in the post-intervention groups ($p=0.96$). Length of hospital stay pre-implementation was 7.3 days and post-implementation was 5.4 days ($p=0.05$).

CONCLUSIONS: Implementing an EMR-based reminder was associated with a significantly reduced length of hospital stay without significantly increasing mortality at a single VA medical center. Appropriately reducing length of hospital stay for pneumonia has been previously demonstrated to be associated with reduced costs, and may potentially be associated with improved patient safety. Additional research is needed to determine if this reminder can be successfully implemented in other hospitals.

ELECTRONIC PHARMACOVIGILANCE OF PATIENTS NEWLY STARTED ON MEDICATIONS FOR HYPERTENSION, DIABETES, INSOMNIA, OR DEPRESSION

Elissa V. Klinger³; Alejandra Salazar³; Jeffrey Medoff³; Patricia C. Dykes³; Jennifer Haas¹; Japneet Kwatra³; Endel J. Orav⁴; Lucas Marinacci³; Shimon Shaykevich²; David W. Bates²; Gordon D. Schiff³. ¹BWH, Boston, MA; ²Brigham and Women, Boston, MA; ³Brigham and Women's Hospital, Boston, MA; ⁴Northwestern University, Boston, MA. (Tracking ID #2200262)

BACKGROUND: The safe and effective use of prescription drugs in the outpatient setting requires monitoring of patients to track outcomes and ensure potential adverse effects are identified and addressed in a timely fashion. Automated approaches offer the promise that such monitoring could be performed easily, reliably, and efficiently. We developed a patient-centered, EHR-integrated interactive voice response system (IVRS) to actively monitor the safety and effectiveness of treatment for patients taking FDA-approved medications for one of four common chronic conditions (diabetes, hypertension, insomnia, depression), with integrated management support by a clinical pharmacist. We report on preliminary findings of Calling for Earlier Detection of Adverse Reactions (CEDAR), a cluster-randomized, controlled trial.

METHODS: Eighteen primary care clinics using an integrated EHR were identified and matched based on geographic and patient-population characteristics and then randomized to either an intervention or control arm. We developed an algorithm to identify any adult primary care patient at any of the clinics who had been newly started on a medication for one of these four conditions. Eligible patients in the intervention clinics were sent a letter with study information and an opportunity to decline participation. Using automated IVRS phone calls, patients were called 4–6 weeks and again at 6–8 months following their medication start date and prompted to confirm that they were taking the drug and it was prescribed for the condition of interest. The IVRS then asked a series of targeted questions querying both adherence and symptoms commonly associated with ADRs. Any patient with a positive symptom was transferred to a clinical pharmacist in real-time at the conclusion of call; these IVRS-collected data sent a real-time secure email message to the pharmacist, containing relevant clinical information captured during the call, including reported possible drug-related symptoms. Patients reporting no symptoms on the IVRS call could also opt to transfer to the pharmacist. All patients counseled by the pharmacist had a note filed in the EHR, with more urgent clinical concerns triaged accordingly. Eligible patients from control clinics were identified via the EHR using the same eligibility criteria but did not receive any component of the intervention. A manual chart review at

1 year from time of the target prescription was performed for the intervention group and for a set of controls generated by propensity score matching. This outcome chart review compared target drug discontinuation, action taken by clinician following patient-reported symptoms consistent with ADRs, and other clinically relevant information.

RESULTS: Between June 2013–September 2014, 11,945 eligible patients from nine intervention and nine control clinic sites were identified who were classified as a new start on one of 103 target medications. Of these, 4847 eligible intervention patients were called and 609 (12.6 %) participated in the IVRS interviews, 496 (10.2 %) actively declined participation, and the remaining patients (77.2 %) either answered but did not complete the call or did not answer any call attempt. Of the 609 participating patients, 306 (6.3 % of all patients called, 50.2 % of those completing the calls) reported symptoms consistent with ADRs. A total of 430 (8.9 % of all patients called) were transferred to the pharmacist (for reported symptoms or request to speak to pharmacist) and had notes filed in their charts and their PCPs alerted accordingly. Outcome chart reviews are on-going as the cohort of participants reaches 1 year of follow-up to compare the percent of patients with identified adverse effects, drug discontinuation, and physician awareness and action in the intervention vs. control cohorts.

CONCLUSIONS: We demonstrate that an EHR-integrated IVRS that leverages real-time data capture and live transfer to a pharmacist can be an effective tool to reach out in a proactive manner to patients starting new medications. Consistent with prior studies screening for ADRs, 1 in 3 participating patients reported a potential ADR, many of which had not been reported or documented previously by the PCP. Our specially designed system allows real time transfer of IVRS calls to a pharmacist who can simultaneously access patient-reported data and the patient's chart, and thereby troubleshoot symptoms that may be consistent with ADRs that may necessitate a change in dosage or a drug discontinuation. For patients not experiencing symptoms, the platform also provides a service to individuals who have questions or concerns about their medications.

ENGAGING RESIDENTS IN VENOUS THROMBOEMBOLISM PREVENTION AND STROKE QUALITY MEASURES THROUGH AN INTERACTIVE CHECKLIST AND INCENTIVE PROGRAM

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BACKGROUND: Venous thromboembolism (VTE) is the most common preventable cause of hospital death. Stroke is the third leading cause of death in the United States. Given that checklists have been demonstrated to improve patient safety, we developed a novel, interactive Electronic Medical Record (EMR) checklist to monitor real-time gaps in VTE prevention and stroke process measures. We hypothesized that the use of this platform, coupled with a pay-for-performance plan, would globally engage residents in quality improvement and optimize the clinical learning environment as specified in the Accreditation Council for Graduate Medical Education "CLER Pathways to Excellence".

METHODS: The real-time, interactive checklist was launched 1/1/14 for all adult patients at four hospitals within a major academic center. Twenty resident quality directors from various residency programs across the system led daily monitoring of performance and provided feedback on care gaps to physicians, midlevel providers, and 800 resident colleagues. Data on VTE prevention and stroke process measures were sampled and abstracted as per The Joint Commission and CMS guidelines.

RESULTS: Compliance with VTE prevention measures in the 6 months prior to implementation of the checklist and resident engagement program was 88.46 % and in the 6 months post-intervention was 94.15 %, with analysis done using the Mann–Whitney U test with $p<0.006$. Similarly, compliance with stroke process measures 6 months prior to intervention was 88 % compared to 96.56 % post-intervention ($p<0.024$). Over 800 residents received their second incentive payment in November 2014.

CONCLUSIONS: Implementing a real-time, interactive decision support checklist and pay-for-performance program for residents improved compliance with VTE prevention and stroke process measures. Empowering residents through leadership roles has been an important step toward integrating them into the quality infrastructure of the health system. Our project is unique in complexity, magnitude and goals in engaging trainees from training programs across the spectrum for one unified vision and purpose—increasing compliance for evidence based quality measures.

FALLING THROUGH THE CRACKS: CAN A MEDICAL HOME IMPROVE ACCESS AND CARE COORDINATION FOR PEOPLE WITH MENTAL HEALTH ISSUES?

Chloe Anderson¹; Rose Kleiman¹; Dominique Hall¹; Susan L. Hayes¹. The Commonwealth Fund, New York, NY. (Tracking ID #2198275)

BACKGROUND: About a quarter of U.S. adults live with a diagnosable mental illness. These individuals are at higher risk for comorbid chronic conditions, and without accessible and coordinated care, they may not receive appropriate treatment. This analysis provides an overview of the access and coordination problems faced by insured people with mental health issues, as compared to the general insured population, and explores whether having a medical home may mitigate these disparities in care experiences.

METHODS: Data come from the 2013 Commonwealth Fund International Health Policy Survey, a nationally representative telephone survey of adults conducted from February through June 2013. The full sample consisted of 1350 adults ages 18–64 in the United States, 453 of whom reported a mental health issue (defined as emotional distress in the past 2 years or a mental health problem diagnosed by a doctor). In this analysis, we assessed access to care and care coordination among adults who reported mental health problems, and examined the role of a medical home in improving care experiences, using bivariate analysis and logistic regression.

RESULTS: More than one-third of adults reported a mental health issue, including nearly half of all lower income adults; 41 % also reported a chronic condition. Even with insurance, adults with mental health problems had significantly ($p<0.05$) higher rates of ER use (55 vs. 40 %), access problems because of cost (54 vs. 37 %), gaps in care coordination (63 vs. 44 %), and medical or medication errors (31 vs. 20 %), compared to the full sample. Insured adults with a chronic condition in addition to a mental health problem had significantly higher hospital and ER utilization rates than those with a mental health problem and no chronic condition. Medical homes make a difference for adults with mental health issues. Among adults with a mental health issue, the odds of having access problems, care coordination problems, or experiencing a medical or medication mistake were reduced by more than 50 % ($p<0.05$) for adults with a medical home, even after controlling for insurance and other demographic characteristics.

CONCLUSIONS: Consistent with previous studies, our analysis found that having mental health issues may not only lead to high utilization, but also may leave individuals vulnerable to inadequate care coordination and cost-related access issues. Our research shows that the medical home is associated with improved access and care coordination. Mental health is often addressed outside of the health care delivery system despite its impact on physical health. Primary care providers are often unequipped to adequately address patients' behavioral health needs. The Affordable Care Act aims to expand requirements for health insurers to cover mental health benefits. However, in order for this expansion to have an impact on care outcomes, delivery systems need to better integrate physical and behavioral health care. States and payers, likewise, will need to incorporate financing and payment models that support this level of integration. Care coordination, particularly in the form of a medical home, may be one such way to improve outcomes for those experiencing both mental health issues and chronic conditions.

FIFTY YEARS OF HEALTH SPENDING BY LOW, MIDDLE, AND HIGH-INCOME AMERICANS, 1963–2012 Samuel L. Dickman⁴; Steffie Woolhandler³; Jacob Bor⁶; Danny McCormick⁵; David Bor²; David Himmelstein¹. ¹CUNY School of Public Health, New York, NY; ²Cambridge Health Alliance, Cambridge, MA; ³City University of New York School of Public Health, New York, NY; ⁴Harvard Medical

School, Boston, MA; ⁵Harvard Medical School / Cambridge Health Alliance, Cambridge, MA; ⁶Boston University School of Public Health, Boston, MA. (Tracking ID #2196643)

BACKGROUND: Growth in U.S. medical spending has slowed since 2004. Increased patient cost-sharing, a likely contributor to the slowdown, would be expected to have the greatest impact on lower income households, which have seen little income growth during this period. Whether the health spending slowdown has affected all income groups uniformly is unknown.

METHODS: Data on annual health expenditures were compiled from 22 nationally representative surveys carried out since 1963: the 1963 and 1970 Surveys of Health Services Utilization and Expenditures ($N=7759$ and $11,619$, respectively); the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys ($N=38,815$ and $17,123$, respectively); the 1987 National Medical Expenditure Survey ($N=23,652$); and the 1996–2012 Medical Expenditure Panel Surveys ($N=21,571$ – $37,418$ per year). These expenditures data include all spending on health care services, including out-of-pocket and insurance payments. We assessed average expenditure trends for each income quintile according to payer (private insurers, out-of-pocket, Medicare, and Medicaid), type of service (inpatient, outpatient, prescription medications, and dental), and self-reported health status in linear regression models. We also examined trends in the distribution of health expenditures by income group using quantile regression.

RESULTS: Per capita inflation-adjusted health expenditures grew from \$785 in 1963 to \$4309 in 2012. In 1963, prior to the introduction of Medicare and Medicaid, respondents in the lowest income quintile had the lowest health expenditures, despite having the worst health status. By 1977 their expenditures were the highest of any quintile, exceeding those for other Americans by 23 %; this pattern persisted until 2004. Since 2004, expenditures have fallen 3 % for the poorest quintile, increased 9 % for the middle three quintiles and increased 15 % for the wealthiest quintile, which now has the highest expenditures (Figure 1). Since 2004, increases in both per-visit costs and the number of visits drove the rapid rise in health spending among respondents in the highest income quintile. Adjusting for age and health status, 2012 per capita expenditures for the wealthiest Americans exceeded those for the poorest quintile by \$1743, or 43 %. The divergence in health spending by income group since 2004 was limited to the under-65 population, with spending growth among the elderly flat across all income groups. These divergent trends were not driven by a very small number of very high cost patients, but by the larger number of respondents who incurred moderate-to-high health expenditures in any given year.

CONCLUSIONS: The post-2004 slowdown in the growth of U.S. health expenditures was concentrated among lower income Americans, indicative of a reallocation of health care resources nationally towards persons with the highest incomes. The wealthy, who report to be the healthiest segment of the population, now make the most healthcare visits and have the highest healthcare expenditures, a pattern not observed since prior to the introduction of Medicare and Medicaid in the 1960s.

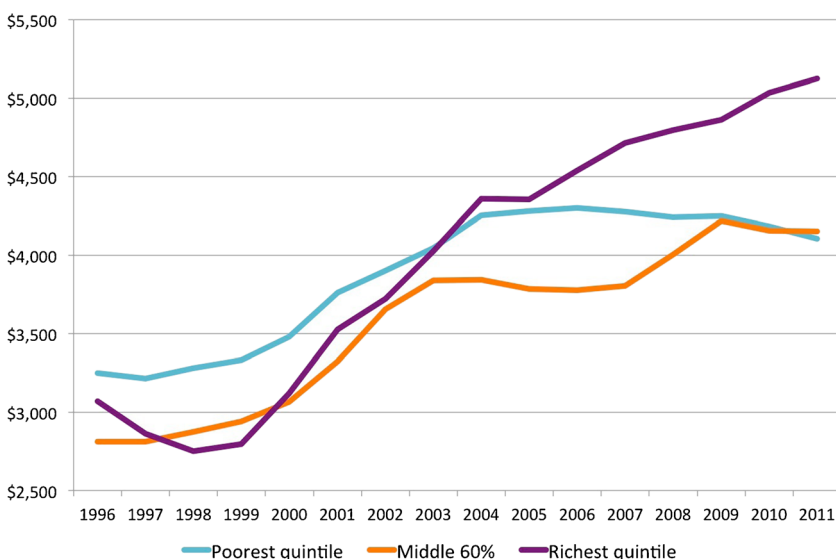


Figure 1: Medical spending by income group, adjusted for inflation, 1996–2012

FINANCIAL BARRIERS TO ADULT VACCINE DELIVERY Laura P. Hurley⁴; Megan C. Lindley²; Mandy Allison⁸; Lori A. Crane³; Michaela Brtmikova³; Brenda Beatty⁹; Megan Snow⁶; Carolyn Bridges¹; Allison Kempe⁷. ¹CDC, Atlanta, GA; ²Centers for Disease Control and Prevention, Atlanta, GA; ³Children's Outcomes Research Program, Aurora, CO; ⁴Denver Health, Denver, CO; ⁵University of Colorado Anschutz Medical Campus, Aurora, CO; ⁶University of Colorado Denver, Aurora, CO; ⁷University of Colorado and Children's Hospital Colorado, Aurora, CO; ⁸University of Colorado, Anschutz Medical Campus, Aurora, CO; ⁹University of Colorado, Aurora, CO. (*Tracking ID #2192476*)

BACKGROUND: A prior national survey found many physicians were not knowledgeable about adult vaccine financing in their practice; little is known about specific financial barriers to adult vaccination. The Affordable Care Act (ACA) increased reimbursement for vaccine administration for Medicaid patients to Medicare levels (~\$25) for 2013 and 2014 and mandated that non-grandfathered health plans and plans for the newly eligible beneficiaries of the Medicaid expansion cover Advisory Committee on Immunization Practices recommended vaccines at no cost to patients while encouraging this practice for traditionally-eligible Medicaid beneficiaries. Our objectives were to assess attitudes about adequacy of reimbursement for adult vaccine purchase and administration, frequency of vaccine claim denial, estimated vaccination profit margin under different payers, and whether practices had considered stopping purchasing vaccines due to financial concerns.

METHODS: We administered a telephone survey 12/2013 to 4/2014 to staff that had been identified as knowledgeable about adult vaccine financing on a prior physician survey. Questions were developed jointly with the CDC and modified based on input from advisory committees and pilot testing. Respondents' practices were stratified by size and financial decision-making capacity and quota sampling was conducted to make sure all practice types were represented. Multiple contacts to set up telephone interviews via mail or email were attempted to encourage non-responders to respond.

RESULTS: The response rate was 39 % (104/266). Most respondents were office managers/health administrators (52 %) or billing personnel (25 %). Respondents reported their practices included patients with the following types of insurance: Medicare Part B (100 %), Preferred Provider Organization (99 %), Private Fee for Service insurance (91 %), Managed Care (83 %), Medicare Part D (76 %), and Medicaid (72 %). Respondents reported perceived reimbursement. Medicaid was most often reported to reimburse less than purchase price for vaccines (58 %), followed by Medicare Part B (39 %). Fifty-four percent of respondents reported Medicaid pays less than \$11 for vaccine administration and 79 % reported Medicaid pays less than \$24 for vaccine administration. Sixty-four percent reported Medicare Part B and 48 % reported Medicare Part D pays less than \$24 for vaccine administration. Thirty-seven percent reported Medicaid and Medicare Part B 'frequently' or 'sometimes' deny vaccine claims. Respondents most often reported losing money delivering vaccines to Medicaid patients (55 %). Regarding profit margin for vaccine delivery in recent years, 40 % reported it had stayed the same, 31 % reported it had decreased, 18 % reported it had increased and 11 % reported not knowing how profit margin had changed. Eight percent had stopped and 3 % had seriously considered stopping purchase of one or more vaccines for adults due to financial concerns. The top reasons for stopping or seriously considering stopping were the upfront cost of purchasing vaccines and the inconsistent coverage across insurance plans.

CONCLUSIONS: Practices may benefit from guidance about how to bill for vaccines including how to distinguish Medicare Part B from Medicare Part D vaccines and how to avoid errors that result in vaccine claim denials. Changes in vaccination reimbursement due to ACA may not yet be fully realized in practices, and may be contributing to a continuing financial burden to stock and administer adult vaccines.

GENDER REPRESENTATION IN THE JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE (JHUSOM) LEARNING ENVIRONMENT Madeleine Manka²; Megan S. Orlando²; David M. Levine¹; April S. Fitzgerald¹. ¹Johns Hopkins University, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD. (*Tracking ID #2198808*)

BACKGROUND: At JHUSOM, 50 % of students and over 35 % of faculty are female, yet study data found female student comfort negotiating for oneself, following on a team, and giving negative feedback decreased from matriculation to the end of the preclinical years, while male student comfort with the same skills increased. It is unclear if aspects of the learning environment contribute to this finding. We hypothesized that exposure to female vs. male leaders differs in the preclinical years and might lead to a disparity in gender-concordant role-modeling.

METHODS: We looked at exposure to academic leaders during the preclinical curriculum and examined the AY 2012–2013 1st and 2nd year courses for gender representation among both core and intercession course directors and lecturers. We used t-tests to

evaluate the proportion of female faculty included as lecturers by female vs. male course directors.

RESULTS: Ten percent (3/31) of academic department heads, 0 % (0/4) of heads of learning colleges, 33 % (8/24) of salary-supported advisors, and 25 % (1/4) of deans in the Office of Student Affairs at JHUSOM are women. In core courses, 26 % (9/35) of course directors, 30 % (121/396) of course lecturers, and 23 % (184/789) of course hours were provided by female faculty. Intersections had 55 % (6/11) female directors, 56 % (30/54) female lecturers, and 54 % (41/75) female lecture hours. Female course directors included higher proportions of female lecturers in their courses than did male course directors (48 % vs. 26 %; $p < 0.0001$).

CONCLUSIONS: Female faculty representation among preclinical leaders has not reached parity with the percentage of females on faculty. Interestingly, female course directors included a higher proportion of female lecturers in their courses. Medical students were not directly studied with regard to faculty gender role-modeling, and further investigation is needed to determine if increased exposure to female leader role-models affects female student comfort with leadership skills.

GUIDELINE-CONCORDANT TREATMENT OF HYPERTENSION AT COMMUNITY HEALTH CENTERS COMPARED TO PRIVATE PHYSICIANS' OFFICES IN THE UNITED STATES Vally Fontil^{2, 4}; Kirsten Bibbins-Domingo^{2, 4}; Oanh K. Nguyen³; David Guzman¹; Lauren Goldman². ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³University of Texas Southwestern Medical Center, Dallas, TX; ⁴University of California, San Francisco, CA. (*Tracking ID #2191557*)

BACKGROUND: Hypertension is the most important treatable risk factor for cardiovascular death, yet it is inadequately treated in nearly half of at-risk adults in the U.S. Community health centers (CHCs) provide care to a disproportionate share of vulnerable populations who are at highest risk for uncontrolled hypertension. Though guidelines recommend escalation of pharmacotherapy for those with uncontrolled hypertension and use of fixed-dose combination medications, thiazides, and aldosterone antagonists in resistant hypertension, it is unknown how hypertension treatment at CHCs reflects guideline-concordant therapy compared to private practice.

METHODS: This study is a cross-sectional analysis of all non-pregnant adults with hypertension receiving care at CHCs and private physicians' offices in 2006–2010 National Ambulatory Medical Care Surveys, a probability sample of outpatient visits in the U.S. Our primary outcomes were prescription of new medication for uncontrolled hypertension (blood pressure above 140/90 mmHg); prescription of fixed-dose combination drugs for those on multiple antihypertensive medications; use of thiazide diuretics among patients with uncontrolled resistant hypertension; and use of aldosterone antagonist for resistant hypertension. Analyses were weighted to reflect national estimates. Odds ratios were estimated from logistic regression models adjusted for patient, visit, and practice characteristics. We also tested for interactions between clinic setting and payer in predicting use of fixed-dose combination drugs and prescribing of new medication for uncontrolled hypertension, hypothesizing that individuals with Medicaid would be less likely to receive either of these interventions due to concerns around affordability.

RESULTS: We identified an estimated 496 million patient visits for hypertension to primary care physicians in private practice and 25.4 million visits to CHCs. Patients at CHCs had higher odds of receiving a new medication for uncontrolled hypertension as compared to private physicians' offices (AOR 1.5, 95 % CI 0.9–2.4). Among patients at CHCs, individuals with Medicaid were as likely as privately insured individuals to receive a new medication for uncontrolled hypertension (AOR 1.0, 95 % CI 0.6–1.9). However among patients at private physicians' offices, those with Medicaid were less likely to receive a new medication compared to those with private insurance (AOR 0.4, 95 % CI 0.1–0.7). Patients at CHCs were less likely to be on fixed-dose combination drugs compared to those at private offices (AOR 0.6, 95 % CI 0.4–0.9). There was no difference in thiazide use (adjusted OR 0.7, 95 % CI 0.4–1.5). Aldosterone antagonist use in resistant hypertension was too low in both clinic settings (<3 %) to perform any reliable multivariable regression analysis.

CONCLUSIONS: Compared to private practices, CHCs are more likely to intensify hypertension treatment for patients with Medicaid but less likely to use fixed-dose combination drugs for patients taking multiple medications. Increasing physician use of fixed-dose combination drugs may be helpful in improving hypertension control, particularly in CHCs where there are higher rates of uncontrolled hypertension.

HIV TESTING AMONG PATIENTS WITH CANCER BEFORE INITIATION OF CHEMOTHERAPY Jessica P. Hwang¹; Bruno Granwehr¹; Harrys Torres¹; Maria Suarez-Almazor¹; Thomas Giordano²; Andrea Gabriela Barbo¹; Heather Lin¹; Michael Fisch¹; Elizabeth Chiao². ¹MD Anderson Cancer Center, Houston, TX; ²Baylor College of Medicine, Houston, TX. (*Tracking ID #2198882*)

BACKGROUND: The Centers for Disease Control and Prevention (CDC) and the US Preventive Services Task Force recommend routine opt-out HIV testing for persons aged 13 to 65 years. In patients with cancer, routine HIV testing is warranted because it has the potential to improve patient outcomes; however, the rates of HIV testing and infection among patients with cancer at the initiation of systemic chemotherapy are unknown.

METHODS: Retrospective cohort study of adult patients with cancer who registered at a comprehensive cancer center from January 1, 2004, through April 30, 2011, and received systemic chemotherapy. We identified rates of HIV-1/2 and/or Western blot testing and HIV positivity at the initiation of cancer therapy. Multivariable logistic regression was used to determine the predictors of HIV testing among patients with AIDS-defining (non-Hodgkin lymphoma [NHL], cervical cancer) and non-AIDS-defining cancers.

RESULTS: A total of 18,874 patients with cancer received chemotherapy during the study period. Of these, 3514 patients (18.6 %) were tested for HIV at the initiation of chemotherapy. The rate of HIV testing was similar among patients 65 years of age or younger (19.5 %) and patients older than 65 years (15.8 %). The prevalence of positive HIV test results among tested patients was 1.2 % (41/3514). The rate of HIV testing was lower in Black patients than in White patients (13.7 vs 19.2 %), but the prevalence of positive HIV test results was higher in Black patients (4.5 %) than in any other racial/ethnic group. Among patients with AIDS-defining cancers, history of NHL, history of sexually transmitted disease, and registration after publication of the 2006 CDC recommendations were significant predictors of HIV testing. Among patients with non-AIDS-defining cancers, the latter 2 factors also predicted HIV testing as did younger age, male sex, history of illicit drug use, and having a hematologic malignancy while Black patients had 30 % lower odds of HIV testing than White patients.

CONCLUSIONS: The prevalence of HIV infection was high among patients with cancer. Our study supports HIV testing in patients with cancer before initiation of chemotherapy. For patients with HIV and cancer, co-management of care by internists and oncologists would allow personalized HIV and cancer care planning and potentially improve clinical outcomes.

IDENTIFYING THE TRAINING AND SUPPORT NEEDS OF VOLUNTEER LAY HEALTH ADVOCATES: A FOCUS GROUP STUDY *Rebeca Rios¹; Margaret Haroth²; Joan Kub³. ¹Johns Hopkins School of Medicine, Baltimore, MD; ²Johns Hopkins Medicine, Baltimore, MD; ³Johns Hopkins School of Nursing, Baltimore, MD. (Tracking ID #2199139)*

BACKGROUND: The use of peer support has emerged as a promising strategy to improve disparities in chronic disease outcomes among racial minority and economically disadvantaged groups. These models train lay individuals (as lay health advisors, community health workers, etc.) to provide self-management support and linkage to community resources, and have demonstrated improvements in reducing health risks and improving chronic disease outcomes. Within faith institutions and other community institutions, individuals trained as lay health leaders are often volunteers. Given the efficacy and proliferation of peer support models, surprisingly little research has addressed the training and support needs of lay health leaders. As a valuable source of human capital and important partner to address community health needs, it is important to develop effective training and support models to meet the needs of lay health leaders. Using focus groups, this study sought to identify the perceived successes, challenges and training and support needs of trained, congregation-based lay health advocates.

METHODS: The LHA program is a 6-week training that covers learn principles and skills to provide self-management support to individuals with chronic diseases. Skills include guidance to effectively engage in health care, support for health behavior change and adherence to medical recommendations, and linkage to community resources. We recruited key stakeholders involved with our Lay Health Advocate (LHA) program, a training program offered through a medical-religious partnership with local faith institutions. We invited individuals to participate who were members of faith community partner organizations and who had trained as LHAs, or who were identified as key stakeholders involved with health advocacy activities within the partnering congregations. We recruited 18 individuals who participated in one of 3 focus groups, each lasting 1 h, 45 min. Mean age of participants was 54 years, and 78 % ($n=14$) were female. The majority (78 %; $n=14$) of participants had taken the LHA training and were African American ($n=10$; 56 %); 8 were White (44 %). 8 (44 %) represented Protestant churches, 8 (44 %) represented Catholic churches, and 2 (11 %) represented other religious traditions. Participants represented 9 churches, the majority of which (67 %) were located in geographic areas designated as medically underserved. Trained study team members moderated the discussions and digitally audio-recorded the groups. Recordings were transcribed verbatim and independently coded by two investigators to identify and group comments into categories with discrete themes. A third investigator adjudicated discrepancies in theme assignments. In order to add confidence to the validity of the findings, we used a process for member checking by inviting commentary from participants on the accuracy of a draft of the thematic codes generated in the analysis.

RESULTS: Consistent themes related to perceived benefits of lay health advocate activities were (1a) the ability to address spiritual and physical health holistically, (1b) provision of social support, (1c) facilitating self-efficacy for health, and (1d) enhancing existing health ministries. Challenges were categorized as (2a) navigating relational and role boundaries, (2b) challenging church policies, and (2c) social stigma. Essential sources of support were categorized into (3a) church leadership support, and (3b), ongoing peer support.

CONCLUSIONS: LHAs have the strong potential to extend needed health information and self-management support to racial and ethnic minority and low income communities. Partnerships with faith institutions to train lay health leaders offer a promising strategy, yet adequate infrastructure and ongoing support for volunteer leaders should be given careful attention. Such support should include ongoing peer support and strategies to promote clergy leadership support for health advocacy. We will use results of this study to develop models for training and support of volunteer lay health leaders.

IMPACT OF CASE MANAGEMENT ON FREQUENT USERS' QUALITY OF LIFE: A RANDOMIZED CONTROLLED TRIAL *Katia Iglesias^{6, 2}; Karine Moschetti^{1, 7}; Stéphanie Baggio³; Venetia - Sofia Velonaki²; Ornella Ruggeri⁵; Olivier Hugli⁴; Bernard Bumand²; Jean-Blaise Wasserfallen²; Jean-Bernard Daeppen²; Patrick Bodenmann². ¹University of Lausanne, Lausanne, Switzerland; ²Lausanne University Hospital, Lausanne, Switzerland; ³Lausanne University, Lausanne, Switzerland; ⁴Lausanne university hospital, Lausanne, Switzerland; ⁵University Hospital of Lausanne (CHUV), Lausanne, Switzerland; ⁶University of Neuchâtel, Neuchâtel, Switzerland; ⁷Lausanne University Hospital, Lausanne, Switzerland. (Tracking ID #2197194)*

BACKGROUND: Frequent emergency department users represent a small number of patients but account for a large number of emergency department visits. They should be a focus because they are often vulnerable patients with many risk factors affecting their quality of life (QoL). Case management interventions have resulted in a significant decrease in emergency department visits, but association with QoL has not been assessed. One aim of our study was to examine to what extent an interdisciplinary case management intervention, compared to standard emergency care, improved frequent emergency department users' QoL.

METHODS: Data are part of a randomized, controlled trial designed to improve frequent emergency department users' QoL and use of health-care resources at the Lausanne University Hospital, Switzerland. In total, 250 frequent emergency department users (≥ 5 attendances during the previous 12 months; ≥ 18 years of age) were interviewed between May 2012 and July 2013. Following an assessment focused on social characteristics; social, mental, and somatic determinants of health; risk behaviors; health care use; and QoL, participants were randomly assigned to the control or the intervention group ($n=125$ in each group). The final sample included 194 participants (20 deaths, 36 dropouts, $n=96$ in the intervention group, $n=99$ in the control group). Participants in the intervention group received a case management intervention by an interdisciplinary, mobile team in addition to standard emergency care. The case management intervention involved four nurses and a physician who provided counseling and assistance concerning social determinants of health, substance-use disorders, and access to the health-care system. The participants' QoL was evaluated by a study nurse using the WHOQOL-BREF five times during the study (at baseline, and at 2, 5.5, 9, and 12 months). Four of the six WHOQOL dimensions of QoL were retained here: physical health, psychological health, social relationship, and environment, with scores ranging from 0 (low QoL) to 100 (high QoL). A linear, mixed-effects model with participants as a random effect was run to analyze the change in QoL over time. The effects of time, participants' group, and the interaction between time and group were tested. These effects were controlled for socio-demographic characteristics and health-related variables (i.e., age, gender, education, citizenship, marital status, type of financial resources, proficiency in French, somatic and mental health problems, and behaviors at risk).

RESULTS: Participants were 45.5 (SD=17.9) years old on average; 56 % were men; 50 % Swiss, 18 % European, and 32 % non-European; 43 % were beneficiaries of social welfare; 69 % suffered from somatic health problems and 50 % from mental health problems; and 32 % had at-risk behaviors. Levels of QoL were on average 54.1 (SD=15.0) for physical health, 54.1 (SD=17.3) for psychological health, 58.2 (SD=24.8) for social relationship, and 58.9 (SD=20.8) for environment (with no significant differences between control and intervention groups at baseline). Multivariate models showed an improvement in QoL for the 4 dimensions (physical health: $b=8.1$, $p<0.001$; psychological health: $b=9.5$, $p<0.001$; social relationship: $b=13.9$, $p<0.001$; environment: $b=10.1$, $p<0.001$) on both groups. Moreover, this improvement was significantly greater for the intervention group concerning the environment element ($b=6.2$, $p=0.016$). No other interactions were significant.

CONCLUSIONS: The case management intervention was accompanied by some improvement in frequent emergency department users' QoL, with a significant positive effect on environment—a dimension composed of items such as physical safety and security,

financial resources, and access to health-care. This result shows the success of case management in this context as the approach essentially aims to improve these aspects by providing assistance in obtaining income entitlements, health insurance coverage, stable housing, and schooling for children, and in preventing potential domestic violence and finding general practitioners or specialists. However, overall, QoL improved over time even without the intervention of the mobile team. One possible explanation could be that being a frequent emergency department user is a transient state associated with vulnerability and with a decrease in QoL, and that adaptation to this condition tends to return QoL to its initial level. A second, more plausible, explanation is that although the control group did not receive a "real" intervention per se, a study nurse contacted participants regularly to ask them about their QoL, which could have created social bonds and generally increased QoL. In terms of policy implications, this study shows that case management may improve environment QoL, and suggests that this dimension is most suitable for short-term interventions.

IMPACT OF HYPONATREMIA CORRECTION ON THE RISK OF 30-DAY READMISSION AND DEATH IN PATIENTS WITH CONGESTIVE HEART FAILURE Jacques Donze^{2,1}, Patrick E. Beeler^{1,4}, David W. Bates^{1,3}. ¹Brigham and Women, Boston, MA; ²Bern University Hospital, Bern, Switzerland; ³Harvard Medical School, Boston, MA; ⁴University Hospital Zurich, Zurich, Switzerland. (Tracking ID #2190632)

BACKGROUND: Hyponatremia has been shown to be associated with worse outcomes in patients with heart failure. There are however conflicting findings regarding its prognostic value for readmission in patients with heart failure, and in particular whether or not correction of a low sodium level at admission affects the risk of readmission and death. We assessed whether correction of a low sodium level during a hospital stay impacted on the risk of 30-day unplanned readmission and death in patients with congestive heart failure, as compared to patients who did not have their sodium level corrected before discharge.

METHODS: We performed a retrospective study on adult patients admitted with a diagnosis of congestive heart failure between July 2003 and October 2009 at a tertiary-care hospital in Boston, MA. We restricted the analysis to those presenting with hyponatremia at admission. We captured the sodium level at admission and discharge to measure the difference between both. The exposure was categorized in 2 groups: 1) hyponatremia at admission without correction during the hospitalization, defined as a sodium level of less than 135 mmol/l both at admission and discharge; 2) hyponatremia at admission with correction during the hospitalization, defined as a sodium level at admission of less than 135 mmol/l, but 135 mmol/l or more at time of discharge. The primary outcome of interest was a composite of 30-day unplanned readmission or death. The secondary outcome was any 30-day unplanned readmission without death. We performed a multivariable logistic regression to evaluate the effect of hyponatremia correction on the outcome.

RESULTS: Among the 4295 eligible patients with hyponatremia at admission, 1799 (41.9%) did not have their hyponatremia corrected before discharge, over a median length of stay of 6 (IQR 3–9). Overall, 1269 (29.6%) patients had a 30-day unplanned readmission or died. In a multivariable logistic regression analysis, the absence of hyponatremia correction was associated with a 46% increase in the odds of having a 30-day unplanned readmission or death (odds ratio 1.46 [95%CI 1.27–1.67]; Table). The odds ratio for specifically any 30-day unplanned readmission was 1.35 (95%CI 1.17–1.57).

CONCLUSIONS: The absence of correction of hyponatremia over the course of hospitalization is frequent and associated with an increase of nearly 50% in the odds of having a 30-day unplanned readmission or death. This may or may not be causal as there is almost certainly confounding by severity of illness, but absence of correction is strongly correlated with a worse outcome.

Comparison of 30-day unplanned readmission and death between patients with and without hyponatremia correction

Variable	Odds ratio	95 % Confidence Interval
Persistent hyponatremia	1.46	1.27–1.67
Age, per additional year	1.00	1.00–1.01
Female vs. male	1.13	0.98–1.30
Race		
White	reference	
Black	1.31	1.06–1.61
Hispanic	1.32	1.00–1.73
Other	1.24	0.79–1.94
Number of admissions in the last 6 months, per additional admission	1.30	1.24–1.36
Unplanned vs. elective index admission	1.86	1.44–2.39

(continued)

Length of stay, per additional day	1.01	1.00–1.01
Atrial fibrillation	1.07	0.92–1.24
Ischemic heart disease	0.86	0.74–0.99
Cancer	1.85	1.56–2.20
COPD	1.02	0.85–1.22
Diabetes	1.12	0.96–1.30
Chronic kidney disease	1.03	0.87–1.24

IMPACT OF THE 2008 USPSTF RECOMMENDATIONS ON CLINICIANS' PRACTICE FOLLOWING AN ELEVATED PSA TEST IN ELDERLY MEN

Sami Ibrahim⁵, Fadi Alkhatib⁵, Shin Yin Lee⁴, Jennifer Friderici¹, Michael B. Rothberg³, Janice Fitzgerald², Mihaela S. Stefan⁵. ¹Baystate Health System, Springfield, MA; ²Baystate Medical Center, Springfield, MA; ³Cleveland Clinic, Cleveland, OH; ⁴Boston University, Boston, MA; ⁵Baystate Medical Center/Tufts Univ. School of Medicine, Springfield, MA. (Tracking ID #2195183)

BACKGROUND: Prostate specific antigen (PSA) for prostate cancer screening remains controversial. In 2008, the United States Preventive Services Task Force (USPSTF) published a statement recommending against screening for prostate cancer in men aged 75 years or older. Since then, 2 studies have shown a decrease in PSA testing frequency in this age group. It is unknown however, whether the 2008 recommendations had any impact on clinicians' approach following an elevated PSA level in elderly men.

METHODS: We performed a retrospective cohort study and structured data abstraction of patients 65 years or older with an elevated PSA test (≥ 4 ng/ μ l), seen at one of 15 community-affiliated primary care practices in Western MA between 1/1/06 and 12/31/10. Patients with an abnormal PSA result in the prior year or with a prior diagnosis of prostate cancer were excluded. A stratified random sample was selected to yield the following study groups of equal sizes ($n=75$ each or 300 total): age $\geq 75+$ and 65 to 75, and into 2 time periods: before and after the USPSTF 2008 recommendations. The primary outcome was PSA retesting frequency within a 12 month follow up period after the first abnormal PSA. Secondary outcomes included (yes vs. no) prostate biopsy, urology referral, prostatectomy and other modalities of therapy including radiation therapy, chemotherapy and hormone treatment. Each outcome was analyzed using multiple logistic regression with an age-group by study period interaction term (criterion p -value for stratification ≤ 0.20). Two-sided p -values of 0.05 were used to determine statistical significance for remaining comparisons. All analyses were performed in Stata 13.1 (© 2014 StataCorp LP, Union Station, TX)

RESULTS: Three-hundred records were abstracted. The average age was 74.7 years (SD 7.0); most patients (82%) were White; (7%) were Black and (5%) were Hispanic. Patient characteristics were similar between pre- and post study periods. The proportion of patients who underwent confirmatory testing decreased slightly in men aged ≥ 75 after the guidelines (53% pre vs. 47% post, $p=0.34$), but increased slightly among men aged <75 (68% vs. 76%, $p=0.28$). The difference in the intervention effect on this outcome achieved borderline significance (difference of 15 percentage points, $p<0.10$). Among those with a confirmatory test, the proportion of patients referred to urologist increased dramatically in both age groups (age ≥ 75 : 35% pre vs. 74% post, $p=0.001$; age 65 to 75: 51% pre vs. 86% post, $p<0.001$); this increase was similar between both groups (difference of 4 percentage points, $p=0.79$). Similar large increase in biopsy rates were noted in both age groups (age $75+$: 8% pre vs. 42% post, $p=0.005$; age <75 : 23% pre vs. 42% post, $p=0.002$). (Difference of 8 percentage points, $p=0.53$). The number of patients receiving prostatectomy, chemotherapy or radiation therapy was small.

CONCLUSIONS: Among patients with an elevated PSA test, the guidelines had no impact on the frequency of repeat PSA testing to confirm result. More patients were referred to urology and underwent biopsy in both age groups after the guidelines.

IN-HOSPITAL COMMUNICATION PREFERENCES AMONG INTERNAL MEDICINE RESIDENTS: EASE OF USE VS. PRIVACY? Micah T. Prochaska², Amber Bird², Amar R. Chadaga³, Vineet M. Arora¹. ¹University of Chicago, Chicago, IL, IL; ²University of Chicago, Chicago, IL; ³Advocate Christ Medical Center, Chicago, IL. (Tracking ID #2199026)

BACKGROUND: Mobile technology (smartphones and tablets) has been shown to improve physician efficiency and providers perceive it to improve inpatient communication. Short message service text messaging (texting) is one form of communication using mobile technology that is easy to use, accessible, and allows for the rapid and direct transfer of clinical information between providers. Therefore, texting has become pervasive in healthcare and is preferred for in-hospital communication between providers,

compared to a traditional in-hospital paging system. Yet, texting is discouraged by the Joint Commission for security reasons, and there are concerns about its HIPAA compliance and ability to protect confidential patient health information when used on personal mobile devices. Currently, it is unclear if inpatient providers share these security concerns and how they may affect providers' preferred method of communicating with other inpatient providers. Therefore, our study aimed to compare internal medicine residents' preferences for texting versus other available in-hospital communication modalities when considering efficiency, ease of use, and security. Additionally, we sought to determine residents' experiences and perceptions of receiving confidential patient information through texting.

METHODS: A cross-sectional survey of internal medicine residents at two academic medical centers during the 2013–2014 academic year. Residents at both institutions were provided iPads through their training programs, and were instructed to use only approved secured applications on the iPad for patient care activities. At both institutions the standard mode of communication between providers was the hospital paging system with a telephone call back. Residents were asked to rank on a four-point Likert scale their preferred form of communication when considering efficiency, the ease of use, and the security of the communication modality. Responses were dichotomized to represent either “preferred” or “not preferred”. Communication options included telephone, email, alphanumeric text (hospital) paging system, and texting. Respondents were also asked to report whether they had received confidential patient identifiers (name, patient initials, or medical record numbers) through any of the above modalities. Descriptive statistics were used to summarize the results.

RESULTS: The overall response rate was 76 % (132/173). For overall efficiency 72 % (94/131) of respondents preferred texting, while 80 % (103/129) of respondents reported texting to be their preferred communication modality with respect to ease of use when communicating with other providers (Fig 1). In comparison, 36 % (46/129) of respondents preferred the current hospital paging system for ease of use when communicating with other providers. However, 83 % (104/126) of respondents rated the hospital paging system their preferred form of communication for security, while only 21 % (26/126) of respondents preferred texting for secure communication. Despite the security concerns of texting, 71 % (93/131) of respondents reported having received protected patient identifiers including a patient's first and/or last name through text messages. Many [82 % (107/131)] reported receiving patient initials through text messages, and half [50 % (66/131)] reported receiving a patient's medical record number through text messages. Responses did not vary by site.

CONCLUSIONS: Our data demonstrates that texting is preferred for in-hospital communication when considering efficiency and ease of use, but that providers are also aware of and concerned about its security. Interestingly, despite concerns about security, a large majority of residents reported receiving confidential patient information through text messaging. One possible explanation is that for providers the benefits of improved in-hospital communication with texting, and any presumed improvements in the coordination and delivery of care for patients, outweigh security concerns they may have. However, inpatient providers, patients, and even health systems may differ on what is an acceptable standard for texting or any new inpatient technology that improves communication or care, at some potential cost to security. As a two-institution study our results may not be generalizable, but they do highlight that there is an important role for the education and training of providers on how HIPAA applies to new mobile technology. Additionally, our findings suggest a tension providers face when communicating, in that texting is ubiquitous, efficient, and may improve care, but at some potential cost to securing patient data appropriately. In the future solutions should be sought that ensure the security and HIPAA compliance of mobile technology, without compromising efficiency and ease of use.

INCIDENCE OF CONVERSION TO ACTIVE WAITLIST STATUS AMONG TEMPORARILY INACTIVE TRANSPLANT CANDIDATES FROM LINGUISTICALLY ISOLATED COMMUNITIES Efrain Talamantes¹; Keith Norris; Carol Mangione; Amy Wateman; John D. Peipert; Suphamai Bunnapradist; Edmund Huang. University of California, Los Angeles, CA. (Tracking ID #2199541)

BACKGROUND: One of the barriers to kidney transplantation occurs at the level of the waitlist, where temporarily inactive candidates cannot receive deceased donor organ offers. We hypothesized that candidates living in linguistically-isolated communities would be less likely to achieve active status.

METHODS: Using Organ Procurement and Transplantation Network/United Network for Organ Sharing data merged with five-digit zip code socioeconomic data from the 2000 U.S. Census, competing risks methods were performed to determine the cumulative incidence of conversion to active status (activation), death, and delisting before conversion among 84,783 adult kidney candidates designated temporarily inactive on the transplant waiting list from 2004 to 2012. Multivariate logistic regression and Fine and Gray competing risks regression were performed to characterize the association between linguistic isolation, incomplete transplantation evaluation, and conversion to active status. The U.S. Census defines a linguistically isolated household as one in which all members 14 years of age and over speak a non-English language and also speak English less than “very well.”

RESULTS: At 8 years, the cumulative incidence of activation was 74.3 %, of death before conversion was 9.7 %, and of delisting was 13.4 %. The most commonly recorded initial reason for inactive status was “candidate work-up incomplete” (54.5 %). Compared to zip codes with <1 % linguistically-isolated households, candidates in zip codes with higher percentages had significantly higher odds of incomplete evaluation: 1 to 5 %, adjusted odds ratio [AOR]=1.07, 95 % CI 1.00–1.14; 5 to 10 %, AOR=1.16, 95 % CI 1.09–1.24; 10 to 20 %, AOR=1.29, 95 % CI 1.20–1.39; ≥20 % AOR=1.38; 95 % CI 1.27–1.50). After adjusting for demographic characteristics, co-morbid conditions, and socioeconomic variables candidates living in zip codes with increasing percentages of linguistically isolated households were strongly associated with decreasing subhazards of activation: 1 to 5 %, sHR 0.89 (0.87–0.92), 5 to 10 %, sHR: 0.84; 0.81–0.87, 10 to 20 %, sHR: 0.77; 0.74–0.79, ≥20 %, sHR: 0.73; 0.70–0.76, versus <1 % linguistically isolated households.

CONCLUSIONS: Our findings indicate that linguistic isolation is strongly associated with failure to complete candidate evaluations and negatively associated with achievement of active waitlist status. This study suggests that candidates living in linguistically-isolated communities may require improved levels of communication from providers to facilitate conversion to active waitlist status.

INCIDENCE OF GENITAL MYCOTIC INFECTIONS DECREASES OVER TIME IN OLDER PATIENTS WITH TYPE 2 DIABETES MELLITUS TREATED WITH CANAGLIFLOZIN Michael Davies¹; Pamela Kushner²; Ujjwala Vijapurkar³; Gary Meisinger³. ¹Janssen Scientific Affairs, LLC, Raritan, NJ; ²University of California, Irvine, CA; ³Janssen Research & Development LLC, Raritan, NJ. (Tracking ID #2197721)

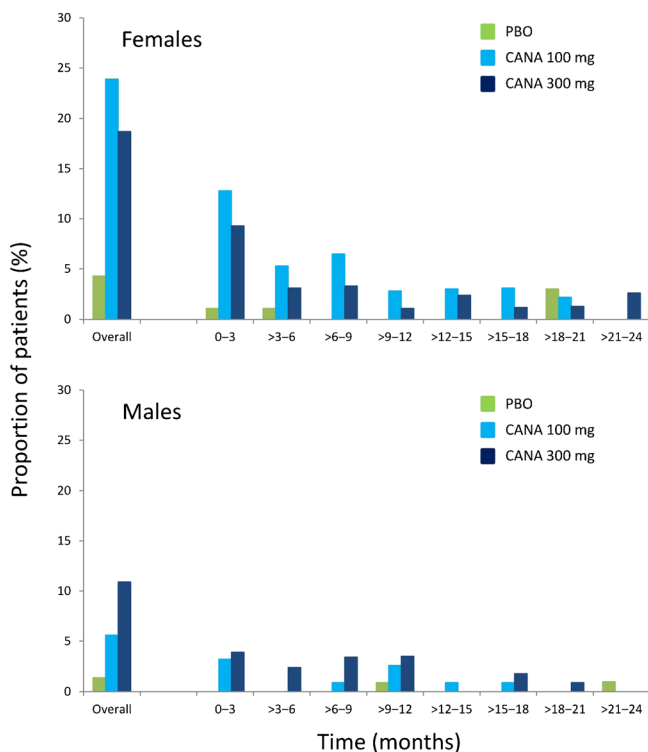
BACKGROUND: Patients with type 2 diabetes mellitus (T2DM) are at increased risk of genital mycotic infections (GMIs), and those with poorly controlled diabetes have higher risks. Sodium glucose co-transporter 2 inhibitors, such as canagliflozin (CANA), improve glycemic control by inhibiting renal glucose reabsorption and increasing urinary glucose excretion, a mechanism of action associated with an increased incidence of GMIs. This analysis evaluated the incidence of GMIs over time in older patients with T2DM treated with CANA.

METHODS: In a double-blind, Phase 3 clinical study, patients aged ≥55 to ≤80 years and inadequately controlled with their current treatment regimen ($N=714$) were randomized to receive CANA 100 mg or 300 mg, or placebo (PBO). The incidence of GMIs was monitored over 2 years, and evaluated overall and at 3-monthly intervals in women and men.

RESULTS: The cumulative incidence of GMIs was higher with CANA 100 mg and 300 mg versus PBO in women (23.9 % and 18.7 % vs 4.3 %) and men (5.6 % and 10.9 % vs 1.4 %). The largest number of events occurred within 6 months of treatment initiation and declined with time (Figure). Between Months 0–3, the incidence of GMIs with CANA 100 mg and 300 mg was 12.8 and 9.3 %, respectively, in women; and 3.2 and 3.9 %, respectively, in men. Between Months >12–15, the incidence of GMIs decreased to 3.0 and 2.4 % with CANA 100 mg and 300 mg, respectively, in women; and 0.9 and 0 %, respectively, in men. GMIs were characterized by investigators as generally mild to moderate in intensity and responded to standard treatment. The most commonly reported female and male GMIs were vulvovaginal mycotic infection and balanoposthitis, respectively. Of the CANA-treated patients, 1.2 % of men and 1.3 % of women discontinued treatment for a GMI versus 0 % on PBO.

CONCLUSIONS: The results of this analysis indicate that, in older patients with T2DM treated with CANA, the risk of GMIs with CANA use is increased mostly early after

treatment initiation. Most GMIs were mild to moderate in intensity and responded to standard treatment.



Incidence of GMIs in older female and male patients with T2DM treated with CANA 100 mg and 300 mg over 2 years

INCORPORATION OF GUIDELINE DATA INTO ORDERING SYSTEMS REDUCES TRANSTHORACIC ECHOCARDIOGRAPHY ORDER FREQUENCY

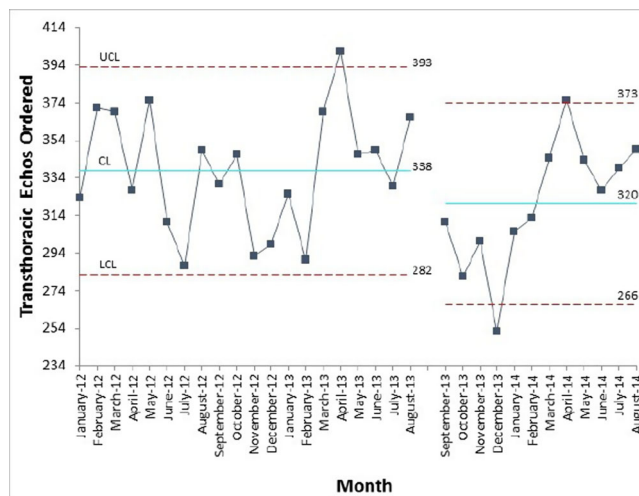
Joel C. Boggan^{1, 2}; Ryan D. Schulte^{1, 2}; Mark Donahue¹; David L. Simel^{1, 2}. ¹Durham Veterans Affairs Medical Center, Durham, NC; ²Duke University Health System, Durham, NC. (Tracking ID #2191290)

BACKGROUND: Guidance for appropriate utilization of transthoracic echocardiograms (TTEs) is available from several sources. At Durham Veterans Affairs Medical Center, approximately 50 % of ordered TTEs are ordered for the indications of dyspnea, edema, and/or valvular disease. We hypothesized that increasing the information available for these indications at the point of order would lead to a reduction in TTEs ordered.

METHODS: We incorporated data from the 2011 Appropriate Use Criteria for Echocardiography, the 2010 National Institute for Clinical Excellence Guideline on Chronic Heart Failure, and the American College of Cardiology Choosing Wisely® list on TTE use for dyspnea, edema, and valvular disease into our electronic ordering system as a quality improvement intervention beginning in September 2013. The primary outcome was the number of TTE orders per month from both the inpatient and outpatient settings modeled using Poisson regression. Secondary outcomes included rates of outpatient TTE ordering per 100 visits and frequency of brain natriuretic peptide (BNP) level ordering in the 30 days prior to TTE ordering. Outcomes were measured for 20 months before and 12 months after the intervention. Ordering rates for TTEs and BNP tests were obtained using the electronic health record.

RESULTS: The number of TTEs ordered across the medical center decreased significantly by 5.3 % after the intervention (338 ± 32 TTEs/month prior vs. 320 ± 33 afterward, $p < 0.01$). Rates of TTE ordering in the outpatient setting also decreased significantly post-intervention (2.28 per 100 primary care or cardiology visits prior vs. 1.99 afterward, $p < 0.01$). Over the same period, outpatient primary care and cardiology clinic visits at DVAMC increased by 10.7 % from fiscal year 2012 to fiscal year 2014. Thus, in fiscal year 2014, the reduced rate means that >300 TTEs were avoided. The intervention significantly interacted with the time from the intervention ($p < 0.01$ for both TTE orders and outpatient TTE orders/visit), as the effect of the intervention partially waned over time. BNP measurement prior to ordering TTEs increased modestly after the intervention (21.8 % prior to intervention vs. 26.1 % after, $p < 0.01$). This was true for TTEs ordered from both the inpatient and outpatient settings (36.5 % prior vs. 42.2 % after in the inpatient setting, $p = 0.01$; 10.8 % prior vs. 14.5 % after in the outpatient setting, $p < 0.01$).

CONCLUSIONS: Incorporation of evidence-based guideline information into ordering prompts for TTEs throughout a VA hospital and its associated clinics led to improved adherence to guidelines with reduced ordering frequency and a significant increase in the frequency of TTEs linked to a prior BNP test. As the immediate effect of the intervention decayed with time, long-term educational strategies may be necessary to optimize utilization of TTEs.



UCL = Upper Control Limit, equal to +3 standard deviations from the mean

CL = Center Line, or mean

LCL = Lower Control Limit, equal to -3 standard deviations from the mean

*Fiscal Year 2012 corresponds to October 2011 through September 2012, Fiscal Year 2013 corresponds to October 2012 through September 2013, and Fiscal Year 2014 corresponds to October 2013 through September 2014. The separating space in the graph indicates the time of the intervention.

INTEREST IN SMOKING CESSATION RELATED TO A SMOKE-FREE POLICY AMONG HOMELESS ADULTS

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BACKGROUND: The prevalence of smoking in the homeless population is 70 %, almost 5 times the general population. The high rates of tobacco use and its associated morbidity and mortality highlight an urgent need for specific tobacco control interventions in the homeless population. Smoke-free policies are an effective population-based strategy to reduce exposure to secondhand smoke among non-smokers and reduce smoking behaviors among smokers. Few studies have explored the potential of smoke-free policies as facilitators of smoking cessation or harm reduction among sheltered homeless adults.

METHODS: We focused on clients of a homeless shelter in San Diego, California. The facility prohibited smoking indoors and outdoors within 5 blocks of the building, and permitted smoking during 4 daily smoking breaks in designated smoking zones away from the building. Staff were not permitted to smoke with clients. Shortly after policy implementation, we interviewed current and former smokers on their smoking behaviors, perceived norms around smoking, and attitudes to smoke-free policies in the facility. Participants reported their level of agreement or disagreement to statements that described the facility's norms around smoking and smoke-free policies.

RESULTS: Of the 170 ever smokers, 75.3 % were current smokers. The average daily cigarette consumption was 6.6 cigarettes per day (SD 4.3). More than half (57.8 %) attempted to quit smoking in the past year, with the average length of quit attempt being 45 days. One-third (33.6 %) of the current smokers reported having used nicotine replacement therapy and 12.5 % used medications in a prior quit attempt. Of the 128 current smokers, less than 15 % agreed that staff offered them cigarettes or smoked with them during smoking breaks. Two-thirds of the current smokers reported never smoking in an area where smoking was prohibited in the past month. Of the current smokers, three-fourths agreed that the facility policies were associated with their reduced consumption, and about half agreed that the policies were associated with either making a quit attempt or getting ready to quit completely. Less than 10 % reported that they would be unhappy to stay in the facility because of the policies. Sixty percent agreed that further restrictions on smoking, beyond the current policies, would be associated with increased interest in quitting smoking completely. Of the 42 former smokers, 30.9 % reported quitting after entering the facility, and of these, about half reported that the facility policies were part or

the main reason for quitting smoking. Almost all current smokers (88.3 %) and former smokers (97.6 %) agreed that smoke-free policies were important because they offered a clean and safe living environment.

CONCLUSIONS: Findings suggest that smoke-free policies may not influence occupancy rates in shelters serving clientele with high rates of cigarette smoking. The facility's policies on smoking were associated with reduced consumption and increased interest in smoking cessation among homeless adults. Thus, establishing a tobacco control program that includes smoke-free policies and resources for cessation may facilitate successful cessation among sheltered homeless adults.

INTERNATIONAL MULTICENTER VALIDATION OF THE "HOSPITAL" SCORE TO PREDICT 30-DAY POTENTIALLY AVOIDABLE READMISSIONS IN MEDICAL PATIENTS Jacques Donze^{6, 1}; Mark Williams⁷; Edmondo Robinson²; Eyal Zimlichman⁸; Drahomir Aujesky⁶; Eduard E. Vasilevskis⁵; Sunil Kripalani⁵; Joshua Metlay³; Tamara Wallington⁹; Grant Fletcher¹⁰; Andrew D. Auerbach⁴; Jeffrey L. Schnipper¹. ¹Brigham and Women's Hospital, Boston, MA; ²Christiana Care Health System, Wilmington, DE; ³Massachusetts General Hospital, Boston, MA; ⁴UCSF Division of Hospital Medicine, San Francisco, CA; ⁵Vanderbilt University, Nashville, TN; ⁶Bern University Hospital, Bern, Switzerland; ⁷University of Kentucky, Lexington, KY; ⁸Sheba Medical Centre, Tel HaShomer, Israel; ⁹William Osler Health System, Brampton, ON, Canada; ¹⁰Harborview Medical Center, Seattle, WA. (Tracking ID #2191115)

BACKGROUND: Efficiently improving transitions in care requires hospitals to target discharge interventions at those patients at high risk of potentially avoidable readmission. We previously derived the "HOSPITAL" score, an easy to use prediction model for medical patients (Table 1). This score had good discrimination for determining potentially avoidable readmissions in the hospital in which it was derived (C-statistic of 0.71). To assess its generalizability, we aimed to externally validate the "HOSPITAL" score in an international multicenter study.

METHODS: We applied the score to 124,212 adult patients consecutively discharged alive from the medical departments of 6 medical centers in the US, 1 in Israel, 1 in Canada, and 1 in Switzerland, between January and December, 2011. The outcome was any 30-day readmission that was classified as potentially avoidable using the previously validated SQLape algorithm. By comparing mainly ICD-9 codes from the two hospitalizations,

SQLape excludes elective readmissions, foreseen readmissions such as chemotherapy, and readmissions for new diseases unknown during the preceding hospital stay unless a known complication of previously received treatment. The performance of the score was evaluated according to its discrimination (C-statistic, representing the area under the ROC curve) and its calibration (based on the Pearson goodness-of-fit statistic).

RESULTS: Among all patients in the cohort, the potentially avoidable readmission rate was 9.5 % (overall 30-day readmission rate was 14.5 %). The discriminatory power of the "HOSPITAL" score to predict potentially avoidable readmission was good with a C-statistic of 0.72 (95 % CI 0.71–0.72). As in the derivation study, patients were classified into 3 risk categories: low (63 %), intermediate (23 %), and high risk (14 %). The estimated proportions of potentially avoidable readmission for each risk category matched exactly the observed proportion, with a consequent excellent calibration ($p=0.97$, with high p values indicating better fit; Table 2).

CONCLUSIONS: The "HOSPITAL" score identified patients at high risk of 30-day potentially avoidable readmission with high discrimination when applied to a large international multicenter cohort of medical patients. The "HOSPITAL" score is the first score to focus on potentially avoidable (as opposed to all-cause) readmissions, using readily available predictors at the time of discharge, and that is externally validated in a large cohort in 4 different countries. This score has the potential to easily identify patients in need of more intensive transitional care interventions to prevent avoidable hospital readmissions.

Table 1. 'HOSPITAL' Score for 30-day Potentially Avoidable Readmissions

Attribute	Points
Low Hemoglobin level at discharge (<12 g/dL)	1
Discharge from an Oncology service	2
Low Sodium level at discharge (<135 mmol/L)	1
Procedure during hospital stay (any ICD-9 coded procedure)	1
Index admission Type: non-elective	1
Number of hospital Admission(s) during the previous year	
≤ 1	0
2–5	2
>5	5
Length of stay ≥5 days	2

Maximum=13 points

Table 2. Observed vs. Predicted 30-day Potentially Avoidable Readmissions (PAR)

Points	Risk category	Patients in each category, n (%)	Observed proportion of PAR in the derivation study, %	Observed proportion of PAR in the validation study, %	Estimated risk of PAR in the validation study, %
0–4	Low	77,896 (63 %)	5.4	5.8	5.8
5–6	Intermediate	29,239 (23 %)	9.0	11.8	11.8
≥7	High	17,077 (14 %)	18.7	22.4	22.4

PAR: potentially avoidable readmission

LOW RATES OF HIV PRE-EXPOSURE PROPHYLAXIS (PREP) AND NON-OCUPATIONAL POST-EXPOSURE PROPHYLAXIS (NPEP) IN A LARGE URBAN HEALTH CARE SYSTEM: IMPLICATIONS FOR IMPLEMENTING PREP AND NPEP Monica Mercon²; Uriel R. Felsen²; Viraj V. Patel¹. ¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical Center, Rye Brook, NY. (Tracking ID #2199596)

BACKGROUND: The Bronx is an ongoing epicenter of the HIV epidemic in New York City with overall prevalence of 1.7 %, some Bronx neighborhoods the rate is as high as 2.6 %, while the general prevalence estimate for the United States is 0.4–0.9 %. The health care system studied provides health care service to more than 2 million people in the Bronx and Westchester, being one of most important health care system in that area. New tools are now available to help prevent HIV acquisition. Several recent trials have shown efficacy of daily oral antiretroviral for pre-exposure prophylaxis for HIV (PrEP) in reducing risk of HIV infection. Post-sexual exposure to HIV is also recommended by using 28 days course of daily highly active anti-retroviral therapy (nPEP). Both PrEP and nPEP have been FDA approved and have been covered by NY Medicaid and most other commercial insurers. Little is known about to what extent these new tools are being used and who is accessing PrEP and nPEP. This study aims to describe socio-demographic characteristics and risk exposure among individuals prescribed nPEP or PrEP in a large urban health care system.

METHODS: We used a previously validated algorithm to identify all HIV negative individuals in the electronic medical records who attended outpatient

visits and had also been prescribed one or more antiretrovirals from January 2011 through March 2014. A standardized chart abstraction tool was used to verify that the antiretrovirals had been prescribed for PrEP and nPEP and to collect sociodemographic and risk behavior data. We conducted descriptive statistics using SPSS 21 statistical software to calculate proportions and means as appropriate.

RESULTS: During the studied period, 51 individuals received nPEP and 10 individuals received PrEP. Socio-demographic characteristics were similar between two groups. Individuals that received nPEP were mostly heterosexual women (33; 64.7 %), or men who have sex with men-MSM (15; 29.4 %), non-white (46; 90.1 %), age range 13–52 years old. The most frequent indication for nPEP was non-consensual sex (24; 47.1 %), and was frequently prescribed at the Emergency Department (30; 58.8 %). Poor adherence to follow up after nPEP was noted; 14 (27 %) among individuals who received PEP had documented 28 days of use of antiretroviral medication. PrEP was prescribed exclusively for heterosexual women (5; 50 %) and MSM (5; 50 %); 9 (90 %) individuals were non-white, and age range was 19–48 years old. PrEP was mostly prescribed by primary care providers (6; 60 %), and almost exclusively for individuals in stable serodiscordant relationship (9; 90 %). There was no record of seroconversion.

CONCLUSIONS: In a large urban health care system with a high burden of HIV, located in a community with a high HIV prevalence, use of antiretroviral medications for nPEP and PrEP was extremely low. Better understanding of barriers to and facilitators of PrEP and nPEP are needed to inform implementation and increase uptake and improve the health of those at risk for HIV.

MEDICATION ADVISING AMONG LIMITED-ENGLISH PROFICIENT PATIENTS Eva Chang¹; Elizabeth Lin¹; Gerardo Moreno²; Ron L. Johnson¹; Heidi Berthoud¹; Leo Morales³. ¹Group Health Cooperative, Seattle, WA; ²UCLA, Los Angeles, CA; ³University of Washington, Seattle, WA. (Tracking ID #2198621)

BACKGROUND: Receipt of verbal and written medication advising for newly prescribed medication is key for medication safety, but little is known about how much information are given to patients with limited-English proficiency. This study described whether medication advising is associated with English language proficiency and immigration-related factors among insured patients with chronic conditions (hypertension, high cholesterol, and/or diabetes).

METHODS: We conducted a cross-sectional telephone survey of limited-English proficiency (LEP; $n=328$) and English proficient (EP; $n=181$) patients in an integrated healthcare system. The survey was administered in 6 languages/dialects (English, Spanish, Korean, Vietnamese, Chinese-Mandarin, and Chinese-Cantonese). Medication advising outcomes for the most recent prescription were verbal (explanation of medication purpose, medication directions, and possible side effects) and written (receipt of medication label in native language, receipt of medication information from pharmacy in native language). Univariate and bivariate analyses were conducted.

RESULTS: Among all patients, 98 % reported being told about the purpose of the medication, 97 % about how to take it, and 87 % about side effects; 85 % received all 3 pieces of verbal information. LEP patients reported similar percentages of receiving all verbal information as EP patients. Only 12 % of all LEP patients reported receiving a medication bottle in their native language and 63 % reported receiving medication information written in their native language. Ten percent of all LEP patients reported receiving both pieces of written information.

CONCLUSIONS: While the majority of patients received verbal medication advising, 10 % of LEP patients received all forms of written medication advising. The results suggest that the health care system can improve health care services to LEP patients. Requiring translated medication labels is an important next step to ensuring that LEP patients take their medications properly and avoid costly medication errors.

OPTIMIZING ACCESS TO OUTPATIENT SPECIALTY CARE IN THE SAFETY NET: A NATIONWIDE SURVEY Chelsea Bowman⁴; Kevin Duan¹; Nathan R. Handley²; Lena K. Makaroun³; Daniel Wheeler⁴; Alice Chen^{4, 5}; Edgar Pierluissi^{4, 5}. ¹UCSF, San Francisco, CA; ²University of California - San Francisco, San Francisco, CA; ³University of California San Francisco, San Francisco, CA; ⁴University of California, San Francisco, San Francisco, CA; ⁵San Francisco General Hospital, San Francisco, CA. (Tracking ID #2190207)

BACKGROUND: Safety-net health care systems struggle to provide timely access to specialty care for uninsured, underinsured and Medicaid populations.

While these challenges are longstanding, little is known about how safety-net health systems monitor specialty care access. We surveyed how specialty care is provided, assessed, and prospectively planned for in a national sample of safety-net health care systems. Based on our analysis, we propose a conceptual framework for how safety-net institutions can assess and plan for the provision of specialty care.

METHODS: We conducted a descriptive study of safety-net hospitals using a semi-structured interview with health systems' leadership to address how systems planned for and measured specialty care access. Our sample included a member from each county in the California Association of Public Hospitals (CAPH) ($N=15$) as well as members of America's Essential Hospitals (AEH) in the 20 largest metropolitan areas according to the US 2010 census data ($N=16$). Thirty-one health care systems were contacted between December 2013 and March 2014. Four authors independently reviewed the interviews and reached consensus on 5 major themes including 1) provider models for specialty care, 2) challenges in access to specialty care, 3) metrics for access, 4) metrics for productivity, and 5) strategies for improving access. The University of California, San Francisco committee on Human Research approved this study.

RESULTS: Eighteen of 31 (58 %) health care systems completed the interview. Of these, 10 were safety-net health care systems in California. A variety of models were used to provide specialty care including: academic affiliation with a School of Medicine, contracting with individual specialists, directly hiring specialists and a combination of these. The most commonly cited challenge to providing specialty care was the lack of available specialists. This was attributed to lower salaries compared to non-safety-net institutions, difficulty obtaining clinical space and inadequate funding for appropriate levels of support staff. The primary metric for measuring specialty care access was appointment wait times, although definition for this metric varied. Additional measures included the ratio of referrals to available clinic slots and patient satisfaction. Many systems collected subjective feedback from specialty leaders and had external consultation groups provide evaluation of specialty care access. Clinic productivity was measured using work relative value units, new to follow up visit ratios and full time equivalent providers to number of patients served. Strategies to improve access were categorized into three main approaches: 1) increasing specialist capacity, 2) expanding the role of the PCP, and 3) enhancing communication and coordination. (Table 1) No system employed a comprehensive framework to help guide provision and assessment of specialty care services.

CONCLUSIONS: Our study confirms that safety-net institutions face significant challenges in providing access to specialty care. Using the themes and metrics identified in our survey, we developed a conceptual framework to evaluate and plan for access to specialty care. (Figure 1) The framework may help health systems optimize existing services and plan for future provision of care.

Strategies for increasing specialty care access

Increasing Specialist Capacity

Employ physician extenders (NPs,PAs) to help decrease specialist physician workload

Place specialists physically within primary care clinic space to improve ease of access and consultation
Use tele-dermatology as means of remote access to dermatology consultative services
Identify appropriate discharges from clinic to increase number of new patient appointments
Increase number of total clinic half-days per week

Adjust clinic schedule to include early morning and evening appointment time slots
Use digital retinal photography to improve access to ophthalmologic care
Reverse the model of primary and specialty care; bring PCPs into specialty care clinics for management of select patients

Expanding Role of PCP

Create "mini-fellowships" for prolonged PCP immersion into specialty clinic, providing PCP with skills to bring back to primary care
Develop system in which specialists develop management plans that are communicated to and carried out by PCPs
Allow some Family Medicine physicians to accept referrals for basic dermatologic procedures
Create "mini-specialty" clinics (e.g. A1c, HTN, CHF, women's health), all staffed by primary care providers
Place physician extenders and primary care physicians in specialty clinic for basic procedures

Enhancing Communication and Coordination

Create electronic referral system with screening template to ensure necessary labs and studies are completed before appointment with specialist
Embed physician support tools and templates within electronic referral to improve specialty referral quality
Utilize a central referral office to coordinate all specialty referrals

Implement an electronic consult ("E-consult") program to allow remote consultation for patients not requiring in-office visits
Organize social events (e.g. informal dinners) to foster education and fraternization between specialists and PCPs
Protocolize initial steps of treating certain medical conditions before initiating referral
Encourage "curbside" consults by disseminating provider contact information
Standardize scheduling for all specialty clinics to improve efficiency of scheduling process and support staff

Utilize electronic health record messaging tools to increase patient-provider communication
Offer telephone visits as alternative to in-person specialty clinic appointments

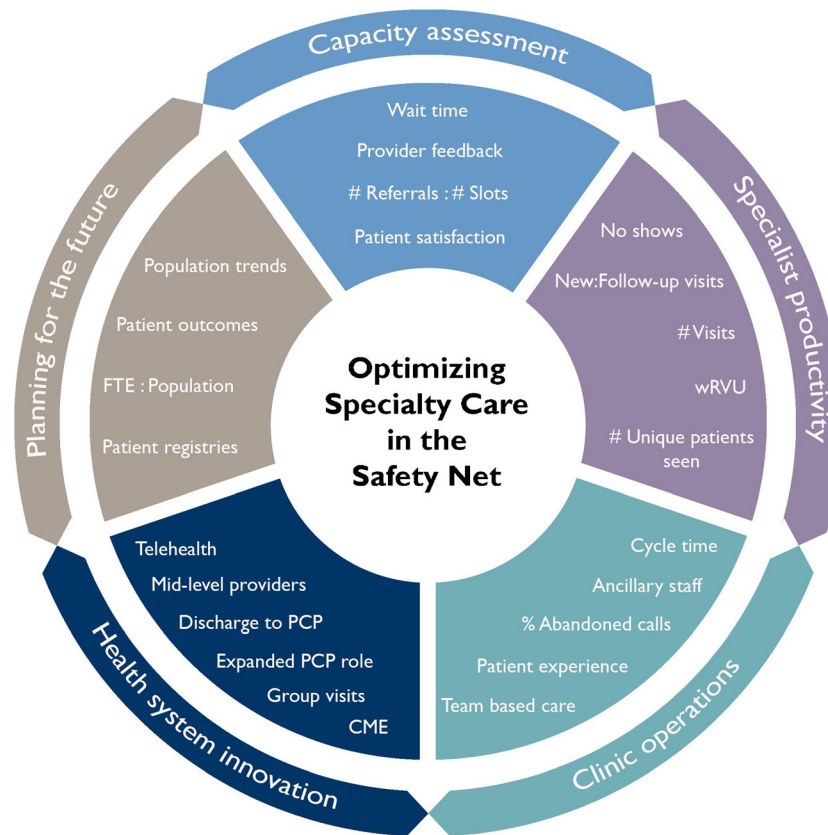


Figure 1: Conceptual framework to evaluate and plan for specialty care.

PERCEPTIONS OF ONLINE PORTAL USE AMONG PATIENTS WITH CHRONIC DISEASE IN A SAFETY NET HEALTHCARE SYSTEM Lina Tieu²; Umimala Sarkar³; Dean Schillinger^{3, 2}; James Ralston⁴; Neda Ratanawongsa^{1, 2}; Courtney R. Lyles². ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³University of California, San Francisco, San Francisco, CA; ⁴Group Health Research Institute, Seattle, WA. (Tracking ID #2192276)

BACKGROUND: Online portals, which provide patients access to electronic health record information, are becoming ubiquitous in the US, especially with the support of Meaningful Use financial incentives. While portals will be the first health technology to reach many diverse patient populations across the country, little is known about barriers to accessing these systems among vulnerable patients, especially among those with chronic illness for whom ongoing self-management is particularly important. This study examined patient and caregiver perspectives to the use of a patient portal before its implementation at San Francisco General Hospital (SFGH) in December 2014.

METHODS: We conducted 16 in-depth interviews with chronic disease patients receiving primary care at SFGH and caregivers providing instrumental chronic disease self-management support, from December 2013 to August 2014. We defined a caregiver as anyone giving formal or informal support in managing the health of a patient. Discussions focused on experiences with the healthcare system, technology use in everyday life, and interest in using an online portal to manage healthcare tasks. All participants were English-speaking (as the portal will only be initially available in English) and reported at least some interest in using a website to manage their healthcare (as we focused on those with existing Internet/computer access). We also assessed participant age, gender, years with diabetes, frequency of Internet use, and health literacy status. We used both deductive and inductive (open) coding to categorize barriers and facilitators to portal use. In an exploratory analysis, we also examined specific barriers among those categorized as having limited health literacy.

RESULTS: The sample included 11 patients and 5 caregivers. The mean age was 55 years, 69 % of the sample had diabetes or cared for someone with diabetes >5 years, and 10 (63 %) had limited health literacy. Overall, 8 respondents (50 %) were African American, 3 were Latino (19 %), 3 were Asian/Pacific Islander (19 %), and 2 were white (13 %); 10 were male (63 %). Ninety-four percent of participants had computer access at home, and approximately 70 % of participants reported using the Internet daily. At the conclusion of the interview, 88 % of participants reported that they would use a portal for future healthcare management. Participants reported completing a range of Internet tasks, such as using search engines, reading news, emailing and using social media, and paying bills. The major barriers to portal use were: concerns about security of information online, lack of technical skills/interest, and preferences for in-person visits/communication. However, participants with limited health literacy more often discussed fundamental barriers to using an online portal, including: challenges with reading, writing, and typing ("I think that's the reason why I don't really use the computer a lot because it's a lot of reading. Like I said, I'm not really a heavily educated guy."); personal experiences with online

security breaches/viruses; and a distrust of potential portal security measures ("Regardless of what a person says that this site is secured and all that, I just don't believe it."). Overall, participants were satisfied with the current healthcare system, but saw the value of a patient portal to increase the convenience of care coordination ("Instead of bugging the front desk...and they have to look everywhere for you...it's convenient I think just looking at the calendar yourself."); improve health monitoring; and support patient-driven communication ("I just hope that it's just useful when you're not at the doctor and you just want to know different information or contact your doctor:").

CONCLUSIONS: Patients in a safety net system reported major barriers to using an online portal. Overall, there was a high level of concern about reading and understanding medical information and preserving existing in-person relationships with providers. However, participants were enthusiastic about using a portal to improve their ability to manage their chronic conditions. Patient portals have the potential to be a convenient and effective way for patients and caregivers receiving care from safety net settings to improve self-management, quality of care, and improvements in health. Our findings suggest a strong need for training and support to assist vulnerable patients with portal registration and use, perhaps most so for those with limited health literacy.

PHYSICIAN ATTITUDES AND PRACTICES REGARDING ADULT VACCINES AND OTHER PREVENTION PRACTICES IN A SHIFTING PRACTICE ENVIRONMENT Laura P. Hurley^{3, 10}; Carolyn Bridges¹; Mandy Allison⁸; Lori A. Crane⁴; Michaela Brtnikova²; Sean O'Leary⁶; Brenda Beaty⁹; Megan Snow⁵; Rafael Harpaz¹; Allison Kempe⁷. ¹CDC, Atlanta, GA; ²Children's Outcomes Research Program, Aurora, CO; ³Denver Health, Denver, CO; ⁴University of Colorado Anschutz Medical Campus, Aurora, CO; ⁵University of Colorado Denver, Aurora, CO; ⁶University of Colorado School of Medicine, Aurora, CO; ⁷University of Colorado and Children's Hospital Colorado, Aurora, CO; ⁸University of Colorado, Anschutz Medical Campus, Aurora, CO; ⁹University of Colorado, Aurora, CO; ¹⁰The Children's Hospital Colorado, Aurora, CO. (Tracking ID #2181305)

BACKGROUND: United States Preventive Services Task Force (USPSTF) and Advisory Committee on Immunization Practices (ACIP) recommendations are widely used to guide delivery of non-immunization and immunization related clinical preventive services, respectively. Rates of all recommended preventive services remain below national goals and vaccination rates often trail rates for other preventive services. The Affordable Care Act (ACA) promotes delivery of preventive services by requiring that USPSTF Grade A and B and ACIP recommendations be provided without cost to several groups of patients and by creating the 'Annual Wellness' visit for Medicare beneficiaries. The short amount of time allotted for primary care visits makes it challenging to deliver all recommended preventive services to adult patients. Little is known about how physicians prioritize vaccination versus other preventive services for adults. Our objectives were to describe among U.S.

primary care physicians: the perceived importance of vaccines relative to other USPSTF or ACIP recommended preventive services and awareness and use of 'Annual Wellness' visits.

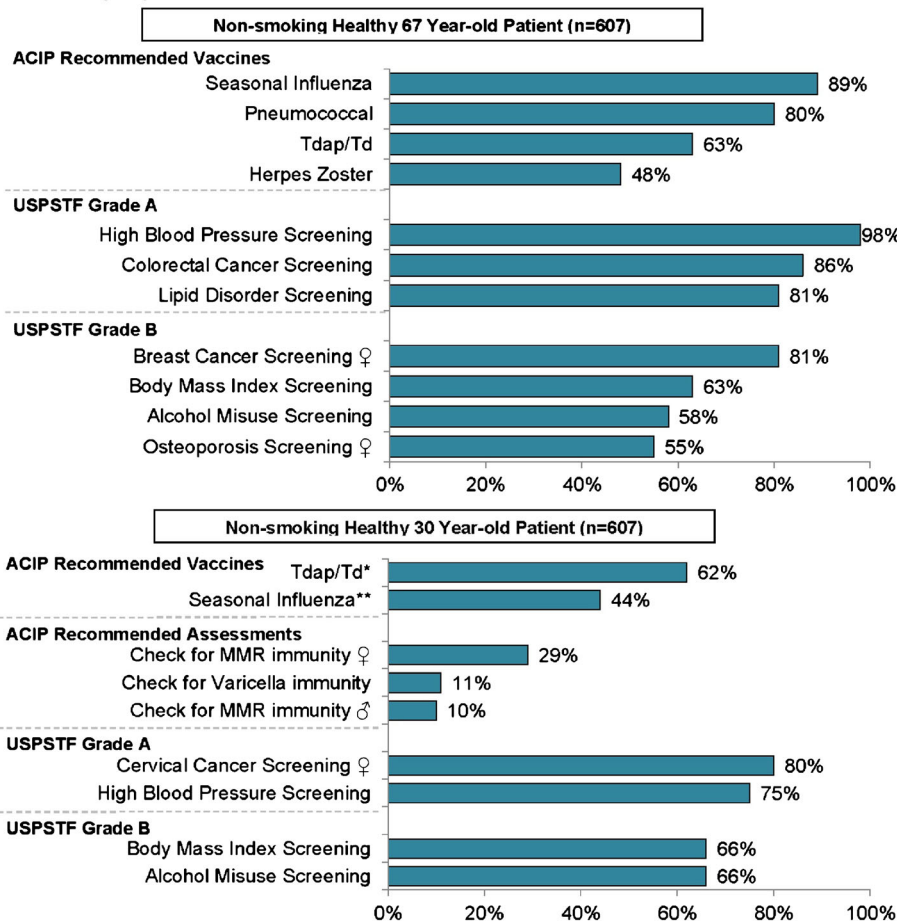
METHODS: We administered an Internet and mail survey from March to June 2012 to national networks of 443 general internal medicine (GIM) and 409 family medicine (FM) physicians representative of the American College of Physicians and American Academy of Family Physicians memberships, respectively. Questions were developed jointly with the CDC and modified based on input from advisory committees and pilot testing among primary care physicians. GIM and FM results were combined where similar with differences noted.

RESULTS: Response rates were 79 % (352/443) for GIM and 62 % (255/409) for FM. Physician perceived importance of ACIP recommended vaccines relative to each other and Grade A or B USPSTF recommended preventive services for hypothetical, gender neutral, non-smoking, healthy 67 and 30 year-old patients are presented in the figure. Eighty-five percent of physicians were aware of

'Annual Wellness' visits, but 30 % of the aware physicians reported having conducted none of these visits in the prior month and 36 % reported having conducted less than ten. Physicians with ≥ 25 % Medicare patients compared to those with <25 % Medicare were more aware of these types of visits ($p=0.03$), but did not report conducting more of these visits ($p=0.38$). Sixty-nine percent of respondents reported it would be feasible, 28 % reported it would not be feasible and 3 % reported not knowing the feasibility of conducting 'Annual Wellness' visits for the majority of their Medicare patients.

CONCLUSIONS: Despite uniform recommendations by ACIP, physicians are prioritizing some vaccines over others, and, sometimes, are ranking them below other clinical preventive services. Whether these attitudes result in missed opportunities for vaccination is uncertain and should be explored. Promotion of use of the 'Annual Wellness' visit might improve delivery of preventive services including vaccine-based prevention for seniors.

Figure 1: % of Physicians Who Reported Vaccine, Assessment, or Screening Measure Was 'Very Important'



USPSTF = U.S. Preventive Services Task Force

Tdap/Td = tetanus, diphtheria, acellular pertussis/tetanus, diphtheria

MMR = measles, mumps, rubella

* Higher proportion of FM than GIM viewed Tdap/Td vaccine as 'very important' (69% vs. 57%, $p<0.01$).

** Higher proportion of FM than GIM viewed Seasonal Influenza vaccine as 'very important' (50% vs. 39%, $p<0.01$).

PHYSICIAN ATTITUDES REGARDING ADVANCE CARE PLANNING FOR PATIENTS UNDERGOING CANCER TREATMENT Ali John Zarrabi¹; Alexandra Rosenberg¹; Julia P. Brockway²; Matthew J. Press³; Orit Saigh²; Jenny J. Lin¹. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Mount Sinai Beth Israel, New York, NY; ³Weill Cornell Medical College, New York, NY. (Tracking ID #2195648)

BACKGROUND: Palliative care can help manage physical and emotional symptoms and improve quality of life during active cancer treatment. Yet many physicians still view palliative care only for terminal cases. We undertook this study to assess perceived roles and responsibilities of medical oncologists and primary care physicians (PCPs) regarding advance care planning for patients receiving active cancer treatment.

METHODS: PCPs and medical oncologists practicing at three academic hospitals in New York City were administered an anonymous survey that included a vignette of a 55 year-old woman with early-stage breast cancer who had comorbid hypertension, hyperlipidemia, and

diabetes. Physicians were asked about their attitudes regarding cancer-related symptom management, goals of care discussions, and palliative care involvement. Descriptive and univariate analyses were used to assess differences between PCPs vs. oncologists.

RESULTS: Of a total of 203 surveys returned out of 232 distributed (response rate 87.5 %), 127 (62.5 %) were from PCPs and 32 (15.8 %) were from oncologists. One hundred fifteen (56.7 %) were attending-level physicians, and 75 (36.9 %) were male. Oncologists were far more likely than PCPs to believe that they had received adequate training in symptom management related to cancer treatment (91 % vs 24 %, $p<0.01$), and more oncologists reported feeling comfortable managing treatment-related physical symptoms (97 % vs 40 %, $p<0.01$). Both PCPs and oncologists felt equally comfortable managing emotional symptoms (80 % vs. 90 %, $p=0.19$) but PCPs were more comfortable than oncologists managing patients' practical needs (49 % vs. 25 %, $p=0.02$). Compared to PCPs, oncologists were less likely to address goals of care with the vignette patient with early-stage cancer (91 % vs. 66 %, $p<0.01$) or to involve specialty palliative care in patients with advanced cancer (92 % vs. 69 %, $p<0.01$). While the majority of PCPs and oncologists felt that all cancer patients should have their goals of care

addressed while undergoing active cancer treatment (89 and 71 %, respectively, $p=0.02$) and reported feeling comfortable addressing goals of care (84 and 97 %, respectively, $p=0.08$), PCPs were more likely to agree with the statement that all cancer patients undergoing active cancer treatment should have a palliative care consultation (62 % vs 13 %, $p<0.01$).

CONCLUSIONS: While the majority of PCPs and oncologists believed that all patients undergoing active cancer treatment should have goals of care addressed, PCPs were more likely to request specialty palliative care for all their active cancer patients, and oncologists were less likely to address goals of care in patients with non-advanced disease. PCPs were half as likely as oncologists to feel comfortable managing symptoms related to cancer treatment. Further efforts should target improving PCPs' confidence in managing cancer-related symptoms and increasing multi-disciplinary collaboration for advanced care planning in cancer patients.

PHYSICIAN VIEWS ON COMMUNICATION AND COORDINATION OF CARE DURING ACTIVE TREATMENT OF PATIENTS WITH CANCER AND COMORBIDITIES Julia P. Brockway¹; Alexandra Rosenberg²; Ali John Zamabi²; Matthew J. Press³; Orit Saigh¹; Jenny J. Lin². ¹Mount Sinai Beth Israel, New York, NY; ²Icahn School of Medicine at Mount Sinai, New York, NY; ³Weill Cornell Medical College, New York, NY. (Tracking ID #2193526)

BACKGROUND: Poorly controlled comorbidities, such as diabetes mellitus, may be associated with poor outcomes during and after cancer therapy. However, the management of chronic medical conditions may be overlooked in patients undergoing active cancer treatment. Part of the challenge lies in identifying the roles of primary care providers and medical oncologists in coordinating care. Few studies have explored medical providers' perceptions and expectations regarding care practices for patients actively undergoing cancer treatment. Our study aims to identify providers' knowledge, practices, and beliefs regarding coordination of care for these patients.

METHODS: We developed a questionnaire centered on a vignette about a 55-year-old woman with early stage breast cancer who had comorbid diabetes, hypertension, and hyperlipidemia.

Primary care providers (PCPs) and medical oncologists practicing at three academic hospitals in New York City were surveyed anonymously about their knowledge, attitudes, and practices regarding care coordination during active cancer treatment. Descriptive and univariate analyses were used to assess differences in the responses between the PCPs and oncologists.

RESULTS: To date, a total of 203 surveys have been completed, with a response rate of 87.5 %. Of these, 127 (62 %) were PCPs, 32 (16 %) were medical oncologists, 11 (5 %) were palliative care physicians, and the remainder were nurse practitioners or physician assistants. More than half (57 %) were attending physicians, and 126 (62 %) worked primarily in a hospital-based setting. Compared to PCPs, oncologists were twice as likely to feel uncertain about which physician should be providing cancer patients' general preventive care (16.5 % vs. 34.4 %, $p=0.02$). Yet PCPs were more likely to feel concerned about duplicated care (23 % vs. 6 %, $p=0.03$). Medical oncologists were more likely to agree with the statement that they can readily access medical specialists for consultation about treatment plans (91 % vs 61 %, $p<0.01$) and most (66 %) felt they had adequate resources and technical support to facilitate communication with other providers, whereas only 44 % of PCPs reported they had adequate resources to facilitate communication ($p=<0.01$). Regarding management of diabetes during active cancer treatment, almost all PCPs and oncologists (99 % vs. 100 %) agreed that diabetes should be actively managed while undergoing cancer treatment. However, more PCPs agreed with the statement "it's okay for diabetes control to be less strict during cancer treatment" (57 % vs. 38 %, $p=0.05$). PCPs were also more likely to agree that patients would miss some diabetes-related visits while undergoing cancer treatment (81 % vs. 57 %, $p=0.01$) and twice as many PCPs (60 % vs 29 %, $p=<0.01$) were able to identify the correct hemoglobin A1c goal of 6.5–7.5 % for the patient in the vignette case.

CONCLUSIONS: Primary care providers and medical oncologists differ in their knowledge, attitudes, and practices regarding the management of comorbid conditions in patients actively undergoing cancer treatment. There is a communication gap and uncertainty about physician roles in providing coordinated care. Further efforts should help providers clearly define their roles to enhance multi-disciplinary collaboration for optimal cancer care delivery.

Table 1: Physician Beliefs Regarding Patient Care during Active Cancer Treatment

Statement, n (%)	PCP (N=127)	Med-Onc (N=32)	p Value
I am often uncertain about which physician is providing patients' general preventative care	21 (16.5)	11 (34.4)	0.02*
I am often uncertain about which physician is providing care for patients' other co-morbid conditions	13 (10.2)	7 (21.9)	0.13
I am often concerned about duplicated care	29 (22.8)	2 (6.3)	0.03*
I am often concerned about missed care	48 (37.8)	8 (25.0)	0.18
This patient's diabetes should be actively managed while she is undergoing active cancer treatment	123 (99.2)	32 (100.0)	1.0
This patient will likely miss some diabetes-related appointments with her PCP while getting cancer treatment	100 (80.6)	18 (56.3)	<0.01*
It's okay for this patient's diabetes control to be less strict while getting cancer treatment	71 (56.8)	12 (37.5)	0.05*
This patient's diabetes would currently best be managed by her PCP	112 (91.1)	26 (86.7)	0.50
It is my responsibility to communicate with other providers regarding my treatment plan for this patient	115 (92.0)	31 (96.9)	0.46
I have adequate resources and technical support to facilitate communication with other providers	55 (44.0)	21 (65.6)	0.03*
I can readily access medical subspecialists for consultation about treatment plans	76 (60.8)	29 (90.6)	<0.01*
Patients of mine typically see providers within my health system	112 (90.3)	22 (71.0)	0.02*

PHYSICIANS', NURSES', PHYSICAL THERAPISTS' AND MIDWIVES' ATTITUDES TOWARDS COMPLEMENTARY MEDICINES: A SURVEY AT AN ACADEMIC HOSPITAL Eléonore Aveni¹; Brent Bauer²; Ramelet Anne-Sylvie¹; Decoster Isabelle¹; Pierluigi Ballabeni¹; Pierre-Yves Rodondi¹. ¹Unil/CHUV, Epalinges, Switzerland; ²Mayo Clinic, Rochester, MN. (Tracking ID #2193889)

BACKGROUND: The use of complementary medicines (CM) has increased in Europe and in the United States during the last decades, although CM are not integrated in most healthcare systems and are not part of the academic's tradition. Few data are available about academic healthcare professionals' attitude towards CM. The objective of this study was to assess the attitude of physicians, nurses, physical therapists and midwives in an academic hospital towards CM.

METHODS: The cross-sectional survey took place from October to December 2013. An email sent to 4925 healthcare professionals (1969 physicians, 2372 nurses, 145 physical therapists, and 111 midwives) working at the University Hospital of Lausanne, Switzerland, invited them to answer a web-based questionnaire. The questionnaire was built according to other surveys among healthcare professionals.

RESULTS: One thousand two hundred forty-seven health professionals answered the questionnaire (response rate: 25.3 %). More female doctors than men answered the questionnaire according to the whole sample ($p=0.044$), but the representativity of the sample was good for other professions (nurses: $p=0.57$; physical therapists: $p=0.49$; midwives: $p=0.39$). A quarter (24.1 %) of healthcare professionals never spoke with patients about the possible benefits of using CM and 43.6 % never spoke about the risks of CM. Although 80.4 % of respondents thought they should inform patients about CM, 44.2 % found it difficult or very difficult to find reliable information about CM at the academic hospital. Respondents admitted that they initiated discussion about CM less frequently (35 %) than patients, with women and professionals trained in practicing CM (16 % of the respondents) having a tendency to initiate more frequently the discussion ($p=0.011$ and $p=0.004$, respectively). The majority of respondents (82.5 %) thought they lacked knowledge about CM with nurses (86 %) and physicians (81.7 %) thinking they lacked more information compared to physical therapists (75 %) ($p<0.001$ and $p=0.003$, respectively). When asked about the impact of several factors on their opinion towards CM, personal experience with CM had a higher impact for nurses (77.6 %) and midwives (85.3 %) than for physicians (51.8 %) ($p<0.001$). Prospective randomized controlled clinical trials published in medical journals had a higher impact on physicians' opinion (75.9 %) compared to nurses (52.1 %) ($p<0.001$). Published case reports had the lowest impact for all professions.

CONCLUSIONS: Our results showed that a quarter never spoke about the potential benefits of CM and 44 % never spoke about potential risks. With the documented reluctance of patients to disclose their use of CM and the risk of herb-drug interactions, healthcare professionals must take a more active role in initiating discussions about CM and be able to inform patients about their use. There is a difference between the professions as to which factor impacts the most on their opinion towards CM: physicians are more influenced by published controlled trials compared to nurses and midwives, who are more affected by personal experience. This could have an impact on the recommendations about CM given to patients. With the need to develop more interprofessional education, CM could be a good example for the introduction of interprofessional training. To our knowledge, it is the largest study about professionals' attitude towards CM at an academic hospital.

PREDICTING LOW TESTOSTERONE IN THE AGING MALE: A SYSTEMATIC REVIEW Adam C. Millar¹; Adrian Lau²; George A. Tomlinson²; Alan P. Kraguljac³; David Simel⁴; Allan S. Detsky¹; Lorraine Lipscombe⁵. ¹University of Toronto, Mount Sinai Hospital, Toronto, ON, Canada; ²University Health Network, Toronto, ON, Canada; ³Mount Sinai Hospital, Toronto, ON, Canada; ⁴Durham VAMC and Duke University, Durham, NC; ⁵University of Toronto, Women's College Hospital, Toronto, ON, Canada. (Tracking ID #2191601)

BACKGROUND: Physicians diagnose and treat suspected hypogonadism in aging men based on low testosterone levels and/or symptoms, extrapolating from the defined clinical entity of hypogonadism found in younger men. The objective of this study is to systematically review the literature to estimate the accuracy of clinical symptoms and signs for predicting low testosterone among men over the age of 40 years.

METHODS: The MEDLINE and EMBASE databases (January 1966 to July 2014) were searched for English-language articles on patient history or physical examination characteristics for identifying low testosterone in males over the age of 40. Original studies on the association between signs or symptoms and low testosterone in men over the age of 40 years were included. Three authors independently reviewed 6053 articles for inclusion and quality review, as well as extracted data from each of the selected 37 papers. The definition of the reference standard (both the method of measuring testosterone and lower limit of normal) varied considerably across studies.

RESULTS: In high quality studies, prevalence rates of low testosterone varied between 14 and 67 %, with a median of 33 %. Threshold testosterone levels used for reference standards also varied substantially. The individual symptoms most commonly evaluated were decreased libido and erectile dysfunction. The summary likelihood ratio (LR) for low testosterone associated with decreased libido was 1.6 (95 % CI: 1.3–1.9), and the LR for absence of this finding was 0.72 (95 % CI: 0.58–0.85). Similarly, the LR associated with the presence of erectile dysfunction was 1.7 (95 % CI: 1.3–2.1) and LR in the absence of erectile dysfunction was 0.76 (95 % CI: 0.61–0.89). In terms of multiple item instruments, the Androtest appears to have both the most favorable LR+ (range 1.9–2.2) and LR- (range 0.37–0.49), but head-to-head comparisons between instruments have not been done.

CONCLUSIONS: Few of the individual signs or symptoms used to identify or exclude low testosterone in men over the age of 40 years had a LR+ ≥ 2.0 , while only one symptom (normal vigor) had a LR- ≤ 0.5 . This poor overall correlation between signs, symptoms and testosterone levels coupled with uncertainty about what threshold testosterone levels should be considered low for older men and the wide variation in estimated prevalence of the condition, makes it difficult to extrapolate the method of diagnosing hypogonadism in younger men to clinical decisions for aging males.

PREFERENCES FOR FAMILY INVOLVEMENT IN END-OF-LIFE DECISION-MAKING Alyssa Harlow¹; Michael Green³; Benjamin Levi²; Jane Schubart⁵; Renee R. Stewart³; Jorge A. Dorantes²; Lisa S. Lehmann^{2, 4}. ¹Brigham and Women's Hospital, Cambridge, MA; ²Brigham and Women's Hospital, Boston, MA; ³Penn State College of Medicine, Hershey, PA; ⁴Harvard Medical School, Boston, MA; ⁵Penn State Hershey Medical Center, Hershey, PA. (Tracking ID #2199218)

BACKGROUND: Of the nearly 2.5 million people who die each year in the United States, 70 % lack decision-making capacity at the end of life. In most cases, family members serve as surrogate decision makers for end-of-life decisions. Family surrogates are often unsure of loved one's preferences for end-of-life decisions, resulting in stress and angst. Furthermore, patients' preferences for level of involvement of family members' in end-of-life decision-making are variable. Addressing these complexities, this study of patients with advanced illnesses aimed to determine their preferences for family involvement in end-of-life decision-making. We also sought to assess whether patients' decision preferences differ by demographic characteristics such as age, gender, race, religion, education, or disease category.

METHODS: We recruited a convenience sample of 92 severely ill patients from Brigham and Women's Hospital and Penn State Hershey Medical Center. Patients were included if they were likely to lose decisional capacity within 2 years and had one or more of the following diagnoses: advanced cancer, severe congestive heart failure (New York Heart Association Class III or Class IV), severe lung disease (Stage III or Stage IV COPD by modified GOLD Spirometric Classification), or End Stage Renal Disease. We measured patients' preferences for family involvement in medical decision-making using the Decision Control Preferences scale. Patients were asked to articulate their preferences for family involvement under two scenarios: 1) when they are awake with decision-making capacity, and 2) when they lack the ability to participate in decision-making. Response options ranged from family-centered (family member wishes take priority) to shared roles (equally weigh family member wishes with their own) to patient-centered (patient wishes take priority). Patients were also asked to weigh family members' versus doctor's input on decision-making. Socio-demographic information was collected for all participants. Descriptive and multivariate analyses were conducted to assess patient control preferences, and predictors of patient control preferences.

RESULTS: The mean age of participants was 63 years (SD ± 14). Fifty-one percent (44) of participants had cancer, 24 % (21) had COPD, 21 % (18) had CHF, and 4 % (3) had ESRD. Seventy-four percent (66) of participants were white, 18 % (16) were black, and 8 % (7) identified as a race other than black or white. Sixty-eight percent (16) did not have a college degree, 71 % (65) reported having strong religious faith, and 29 % (27) reported having weak or no religious faith. Fifty-four percent (50) preferred a shared role in decision-making when awake with decision-making capacity, 38 % (70) preferred patient centered roles, and 8 % (14) preferred family centered roles. When lacking decision-making capacity, less than half preferred a shared role [46 % (42)], opting for either patient-centered [30 % (28)] or family-centered roles [24 % (22)]. Most patients preferred the input of family members and doctors to be weighed equally in both clinical situations (69 % $n=63$ and 63 % $n=56$, respectively). There was no significant association between disease category, age, gender, religion, race and patients' decision control preferences. College education was significantly associated with preferring a patient-centered role in decision-making (OR 2.8, [95%CI 1.2,6.9] $p=0.02$), and with weighing a doctor's input more heavily than family members' (OR 2.8, [95 % CI 1.1,7.4] $p=0.04$). Strong religious faith was significantly associated with preferring a family-centered role in decision-making (OR 0.3, [95 % CI 0.150,0.710] $p=0.005$).

CONCLUSIONS: Only half of severely ill patients prefer a shared role with family members when the time comes to make a significant end-of-life medical decision. When

patients lose decision-making capacity, a significant percentage state a preference for family members' wishes taking priority over their own prior stated wishes. Individuals with a strong religious faith prefer greater family involvement in decision-making. Our findings challenge the commonly held understanding of health care agents being the voice of the patient. In some cases, patients want family members' preferences to trump their own preferences. Patient preferences for family involvement in end-of-life decision making may be highly variable. Therefore, health care providers will need to encourage early communication between patients and family members in order for family surrogates to better understand how their loved ones want end-of-life decisions to be made.

PROGNOSTIC PERFORMANCE OF ECHOCARDIOGRAPHY IN HEMODYNAMICALLY STABLE ELDERLY PATIENTS WITH ACUTE PULMONARY EMBOLISM Eveline Hofmann³; Andreas Limacher⁵; Marie Méan^{3, 1}; Nils Kucher³; Marc Righini⁴; Beat Frauchiger¹⁰; Juerg-Hans Beer⁶; Joseph J. Osterwalder¹¹; Markus Aschwanden²; Christian M. Matter^{7, 8}; Martin Banyai⁹; Michael Egloff⁴; Olivier Hugli¹; Daniel Staub²; Henri Bounameaux⁴; Nicolas Rodondi³; Drahomir Aujesky³. ¹Lausanne University Hospital, Lausanne, Switzerland; ²Basel University Hospital, Basel, Switzerland; ³Bern University Hospital, Bern, Switzerland; ⁴Geneva University Hospital, Geneva, Switzerland; ⁵Clinical Trials Unit Bern, Bern, Switzerland; ⁶Cantonal Hospital of Baden, Baden, Switzerland; ⁷Zurich University Hospital, Zurich, Switzerland; ⁸University of Zurich, Zurich, Switzerland; ⁹Cantonal Hospital of Lucerne, Lucerne, Switzerland; ¹⁰Cantonal Hospital of Frauenfeld, Frauenfeld, Switzerland; ¹¹Cantonal Hospital of St. Gallen, St. Gallen, Switzerland. (Tracking ID #2195765)

BACKGROUND: Evidence suggests that several echocardiographic signs of right ventricular (RV) dysfunction are associated with an increased short-term mortality in hemodynamically stable patients with acute pulmonary embolism (PE). Cardiology guidelines recommend performing transthoracic echocardiography to risk-stratify such patients. Although elderly patients with PE have a higher complication rate than younger patients, the prognostic performance of transthoracic echocardiography to predict adverse outcomes has not been specifically examined in the elderly.

METHODS: We studied 400 hemodynamically stable patients aged ≥ 65 years with acute PE in a Swiss prospective multicenter cohort study between September 2009 and June 2012. Transthoracic echocardiography was performed by blinded cardiologists within three days of PE diagnosis. We defined RV dysfunction as a RV/left ventricular ratio >0.9 or RV hypokinesis (primary definition) or the presence of either ≥ 1 or ≥ 2 of 6 predefined echocardiographic signs of RV dysfunction (secondary definitions). Outcomes were overall mortality, the combination of mortality/non-fatal recurrent venous thromboembolism (VTE) and health-related quality of life at 90 days, and length of hospital stay. We examined the association between RV dysfunction and outcomes, adjusting for patient baseline characteristics.

RESULTS: Overall, 36 % of patients had RV dysfunction based on our primary definition, and 81 and 53 % based on our secondary definitions, respectively. Using our primary definition, there was no association between RV dysfunction and mortality (adjusted HR 0.81, 95%CI 0.35–1.88), mortality/non-fatal VTE (adjusted HR 0.96, 95%CI 0.45–2.08), or quality of life. RV dysfunction was associated with an increased length of stay (adjusted time ratio 1.18, 95%CI 1.03–1.36). Using our secondary definitions, we found no association between RV dysfunction and clinical outcomes. However, RV dysfunction was associated with a poorer quality of life and a longer hospital stay.

CONCLUSIONS: The prevalence of echocardiographic RV dysfunction varied widely based on the criteria used to define RV dysfunction in elderly, hemodynamically stable patients with acute PE. We did not find an association between RV dysfunction and clinical outcomes but patients with RV dysfunction had a poorer health-related quality of life and a longer hospital stay. The assessment of echocardiographic RV dysfunction as a stand-alone risk stratification tool appears to be of uncertain usefulness in elderly, hemodynamically stable patients with acute PE.

READMISSION-FREE SURVIVAL: ACCOUNTING FOR THE EFFECT OF MORTALITY RATES ON CHF READMISSION RATES John Hughes¹; Richard Averill²; James Vertrees²; Norbert Goldfield²; Jean Xiang²; Elizabeth McCullough². ¹Yale University School of Medicine, New Haven, CT; ²3 M Health Information Systems, Wallingford, CT. (Tracking ID #2198922)

BACKGROUND: The sickest among hospitalized patients are the most likely to be readmitted, but are also the most likely to die either in hospital or shortly after discharge. Patients who die cannot be readmitted, and therefore hospitals with excessive mortality rates may have lower readmission rates as a consequence. Support for this possibility comes from several reports of an inverse relationship between hospital mortality rates and readmission rates for Congestive Heart Failure (CHF).

METHODS: We examined the relationship between CHF readmission and mortality rates using CMS data from 2010 to 2012 for 2352 hospitals with more than 100 CHF discharges in 2010. We ranked hospitals by their risk-adjusted mortality rates from the time of admission until 30 days post discharge, using the All-Patient Refined Diagnosis Related Groups (APR DRG) Risk of Mortality method. We used the published Excess Readmission Ratios (ERR) for CHF for each hospital, drawn from Medicare data from 2009 to 2012, as a measure of readmission rates at 30 days after discharge. Medicare uses ERR as part of its formula to determine which hospitals will be subject to payment penalties. Individual hospital ERRs ranged from 0.746 to 1.333, with scores greater than 1.0 indicating higher than expected readmission rates.

RESULTS: While hospitals that score high on one outcome measure might be expected to score high on others, we found a modest inverse correlation between risk-adjusted mortality rates and ERR overall (Pearson = -0.2259) for CHF. We sorted hospitals into quartiles based on the ERR, and calculated severity-adjusted 30-day post discharge mortality rates for each quartile. Average ERR ranged from 0.893 for quartile 1 (Q1) up to 1.116 for quartile 4 (Q4). By contrast, risk adjusted mortality was highest for Q1 (9.0 %), where the ERR was lowest, and conversely was lowest for Q4 (6.8 %), where ERR was highest. These findings are consistent with an inverse relation for mortality and readmission rates. We then calculated a Readmission-Free Survival Rate (RFSR), a measure of positive performance based on the number of patients admitted for CHF who had survived hospitalization and had neither died nor been readmitted by 30 days after discharge. By including both readmissions and mortality, this calculation minimizes any censoring effect of excessive mortality rates. RFSR overall was 73.9 %, ranging from 75.8 % in Q1 to 72.2 % in Q4. We then examined the relationship between the CMS ERR and the RFSR with a cross-tabulation of quartiles to see how assessments of hospital performance would differ between the two measures. There were substantial differences within ERR Q4 (worst performing), containing the hospitals with the highest ERR scores. Twenty-five percent of hospital in EER Q4 would have ranked in the top two quartiles of RFSR (best performing), and over half (52 %) would have ranked in the top 3 RFSR quartiles.

CONCLUSIONS: These results confirm that lower readmission rates can be associated with higher mortality rates for CHF. Some hospitals could therefore be subject to financial penalties for excess readmissions under current Medicare rules, even though they had better overall survival outcomes. These findings can be explained in two ways: either because high-readmission hospitals kept their patients alive longer, who therefore had more opportunity to be readmitted, or perhaps because more frequent hospitalizations actually helped to keep their CHF patients alive longer. The Readmission-Free Survival Rate is a useful measure to assess the impact of CHF mortality rates on hospital readmission performance.

RED CELL DISTRIBUTION WIDTH (RDW) AS A PREDICTOR OF CLINICAL OUTCOMES IN PATIENTS WITH HYPERTENSIVE CRISIS Sagger Mawri²; Suraj Raheja¹; Alexander Michaels¹; Joseph Gibbs¹; Niraj M. Patel¹; Bharat Rao¹; Ruchir Patel¹; James McCord¹. ¹Henry Ford Health System, Detroit, MI; ²Henry Ford Hospital, Detroit, MI. (Tracking ID #2196441)

BACKGROUND: Red cell distribution width (RDW) is a measure of the variability in size of erythrocytes. A high RDW value indicates greater variation in size between individual erythrocytes and has been shown to be an independent predictor of mortality in patients with coronary artery disease, heart failure and in patients undergoing percutaneous coronary intervention (PCI). The aim of this study was to evaluate the prognostic value of RDW in predicting clinical outcomes in patients with hypertensive crisis.

METHODS: We performed a retrospective study of 465 consecutive patients from January 2007 to March 2010 who presented with hypertensive crisis. Hypertensive crisis was defined as systolic BP >180 and/or diastolic BP >110 mmHg with impending or progressive end organ dysfunction requiring inpatient hospitalization. The study sample consisted of 465 patients (38.9 % men; mean age 59.6 ± 15.9). Baseline levels of RDW were measured at time of admission and analyzed as continuous and categorical variables (elevated RDW was defined as >14.5 %). Multivariable regression analysis was performed for development of all-cause mortality, myocardial infarction, new-onset heart failure (defined as first time hospital admission for heart failure), stroke and MACE (MI, new-onset heart failure and stroke) at 2 years.

RESULTS: RDW >14.5 % was a strong independent predictor of all-cause mortality at 2 years (OR: 1.90, 95 % CI: 1.1–3.3, $p < 0.05$). Elevated RDW was also found to be an independent predictor of new-onset heart failure at 2 years (OR: 1.97, 95 % CI: 1.1–3.7, $p < 0.05$). Elevated RDW was not a predictor of MI, PCI or stroke at 2 years.

CONCLUSIONS: Elevated RDW level in patients with hypertensive crisis was an independent predictor of all-cause mortality and new-onset heart failure in patients with hypertensive crisis.

REFERRAL BY PRIMARY CARE PROVIDERS INTO THE POWER WEIGHT LOSS TRIAL WAS NOT ASSOCIATED WITH GREATER WEIGHT LOSS

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BACKGROUND: Primary care providers (PCPs) play an important role in identifying and counseling obese patients to lose weight. However, PCPs report many barriers to weight loss counseling and many prefer to refer patients into effective weight loss programs. The Hopkins POWER behavioral weight loss trial provided an opportunity to evaluate the method of recruitment into the trial and to determine if PCP referral is associated with greater weight loss and participation rates. We hypothesized that participants referred to the POWER trial by their PCP achieved greater weight loss and had higher participation rates and satisfaction level compared to other non-PCP recruitment methods.

METHODS: The Hopkins POWER trial was a 3-arm randomized controlled trial of 415 obese patients with at least one cardiovascular risk factor from six primary care practices in the Baltimore, MD area. Participants were randomized to a control group or one of two behavioral weight-loss interventions (remote or in-person coaching). A screening survey assessed participants' stated recruitment method, which was dichotomized into "PCP referral" or "non-PCP" recruitment (including brochures or posters in the practice, mailed letters) methods. Study participants assigned to the intervention arms had PCPs who reviewed their weight loss progress reports at routine office visits and encouraged their participation. The primary outcome was percent weight change from baseline to 24 months. The secondary outcomes were satisfaction with PCP-patient relationship and participation rates in the intervention, assessed as the percentage of recommended coach contacts and web logins. We conducted longitudinal mixed-effects model, adjusting for clinic, sex, age, and race or ethnic group.

RESULTS: Of the 415 participants, 171 (41 %) reported PCP referral compared to 244 (59 %) who reported other recruitment methods. Those referred by their PCP were younger (52.8 ± 0.8 vs. 54.9 ± 0.7 years, $p=0.04$), had a higher BMI (37.6 ± 0.4 vs. 35.9 ± 0.3 kg/m², $p=0.0006$), were more likely to be female (71.4 % vs. 58.2 %, $P=0.0006$), and African American (46.2 % vs. 37.3 %, $p=0.0006$). Participants in both "PCP referral" and "non-PCP" recruitment groups lost similar percentages of weight from baseline to 24 months (between-group difference: -0.6 %, 95%CI -2.3 – 1.1 %; $p=0.49$), after adjusting for age, race, gender, and clinic site. PCP referral was also not significantly associated with percentage of completed coach contacts and web logins. However, those referred by their PCP into the trial reported higher satisfaction with the relationship with their PCP at the end of trial ($p=0.003$).

CONCLUSIONS: Our study represents the first of its kind to examine the role of PCP recruitment of patients into a weight loss trial. Although the POWER trial was not designed to evaluate the effect of PCP recruitment on weight loss outcomes, our study does highlight the need for additional research to develop strategies for PCPs to identify eligible patients and recommend weight loss programs to ultimately impact patients' success.

REFORMING AMBULATORY RESIDENCY EDUCATION: LONG TERM IMPACTS ON LEARNING, SATISFACTION, AND CAREER DECISIONS

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BACKGROUND: Restructuring of ambulatory residency education has been promoted by professional groups. A major goal of reform is to increase the number of trainees entering primary care careers. Between 2010 and 2014 our health system sought to improve ambulatory education and increase the number of residents entering primary care through an iterative reform. Changes at the institutional level included electronic health record implementation and improving compensation for residency graduates entering primary care. Departmental initiatives were patient centered medical home (PCMH) transformation and a Hospital Medical Home Demonstration Grant to support care coordination within the resident practice. Residency program changes included establishing a 4+1 residency schedule and implementing a resident mentoring program, a team based learning curriculum, and a community primary care rotation. We sought to assess whether teaching, learning, and satisfaction with ambulatory training improved over the 4-year period, and whether more residents entered primary care careers subsequent to the reform.

METHODS: We employed a pre- and post-intervention survey to study second and third year internal medicine residents at a large residency program in New York. Residents are assigned to one of two ambulatory sites; a hospital-based clinic and a freestanding faculty and resident practice. All 2nd and 3rd year residents in the program were surveyed in 2011 regarding the prior academic year (2009–10, baseline) compared with the 2010–11

academic year (first round of reform) using a retrospective pre/post assessment methodology. All 2nd and 3rd year residents were surveyed in April 2014 (post-all reform efforts) using the same items. Residents reported career plans from the years 2010–2014. The Table displays key features of each redesign effort. The primary outcomes were self reported teaching and learning, satisfaction with ambulatory training, and number of trainees entering primary care careers. Secondary outcomes were measures of continuity and workload. All measures were validated and used in prior educational research.

RESULTS: The overall response rate was 93 %. A total of 46 % of residents were PGY2, 53 % were male, and 71 % practiced at the PCMH site. Mean scores on self reported learning and faculty teaching scales improved significantly over the study period (mean 3.6 baseline vs. 4.1 post-reform on a 1–5 Likert scale, $p<0.01$ and 3.3 baseline vs. 3.6 post-reform, $p=0.04$, respectively). Resident enjoyment of clinic improved during the study period as did satisfaction with the overall ambulatory experience (3.1 vs. 3.8 on a 1–5 Likert scale, 2.9 vs. 4, $p<0.01$ for each). Residents reported that the schedule supported continuity of care to a higher extent in 2014 than 2010 (2.3 vs. 3.6, $p<0.01$). The number of patients seen per half day declined (5.9 vs. 4.3, $p<0.01$). The number of residents entering careers in primary care was: 0 (2010), 2 (2011), 1 (2012), 1 (2013) and 8 (2014).

CONCLUSIONS: Four years after implementation of a large structural and educational reform effort, residents reported improvements in learning and teaching, continuity, and satisfaction with ambulatory training. This came at a cost of fewer patients seen per day. Our redesign efforts addressed several of the factors reported in the literature as important towards increasing the primary care workforce, and included institution, department, and program-level reforms. A greater number of residents planned to enter primary care careers in the final year of study. The strengths of this intervention included its comprehensive approach and buy-in at all levels of the health system. Strengths of the evaluation include using validated measures over four years and studying two ambulatory sites. Limitations of the evaluation include potential confounding by concurrent changes to residency education, and surveying different residents in 2010–11 and 2014. More follow-up data on resident career paths is needed.

Components of ambulatory reform

Level	Date	Component	Description
Institution	2010 and 2012	EHR conversion	Allscripts electronic health record implemented
	2010	Compensation enhancement	Included loan forgiveness, base salary increase, and incentive program for primary care clinicians
Department	Late 2009	PCMH certification	National Committee for Quality Assurance level 3 certification
	2010	Hospital Medical Home Demonstration grant	Grant funded hiring of a nurse practitioner, clinic secretary, and data analyst to improve continuity in resident clinic
Program	2010	4+1 schedule	Block schedule where residents do not assume simultaneous inpatient and outpatient responsibilities
	2010	Residency mentoring	One-on-one mentoring for residents in their clinical area of interest
	2012	Team-based learning curriculum	Approach to ambulatory curriculum based on individual preparation, team problem solving, and skill application
	2012	Community primary care rotation	Residents practice alongside seasoned primary care physicians

RESIDENT RESILIENCY - HOW RESILIENT ARE OUR MEDICAL TRAINEES AND HOW DOES IT RELATE TO STRESS AND BURNOUT?

Amber Bird; Amber Pincavage. University of Chicago, Chicago, IL. (Tracking ID #2192709)

BACKGROUND: Burnout amongst medical professionals is a growing concern. Many studies have shown that burnout is pervasive amongst medical trainees and is associated with increased rates of depression, suicide, and poor clinical performance. Data exists showing the correlation between physician burnout and depression. However, there remains little data on how physician burnout relates to resilience.

METHODS: Our objectives were to characterize levels of resilience amongst Internal Medicine residents and examine how levels of resilience impact self-reported measures of stress, burnout, and clinical performance, looking specifically at experience with medical errors and medical error reporting. Cross-sectional surveys were provided to a convenience sample of Internal Medicine residents attending the 2014 Northern Illinois Regional American College of Physicians meeting. Baseline resilience scores were assessed using the validated Connor-Davidson Resilience scale (CD-25). Responses were then divided into resilience categories of low (CD-25 of <70), intermediate (CD-25 70–79), and high (CD-25 80–100). Residents were also surveyed on their experience with burnout, resilience training, and involvement in medical errors.

RESULTS: A total of 77 residents from six institutions completed surveys. 26.0 % of residents had high resilience, 43.9 % intermediate, and 31.2 % low (range 40–100). The majority of residents believe burnout is an important issue during residency (92.2 %). Trainees with high resilience were more likely to report never having stress interfere with their relationships outside of work as compared to trainees with low resilience (high-40.0 %, low-0.0 %, $p<0.001$). High resilience residents were more likely to report having the skills to manage feelings of stress and burnout (high-80.0 %, low-45.8 %, $p=0.02$) and less likely to report feeling inferior to peers (high-20.0 %, low-70.8 %, $p<0.001$). There was a trend towards more trainees with high resilience reporting less burnout from work (rarely or never feeling burnout) compared to trainees with low resilience (high-40.0 %, intermediate-27 %, low-16.7 %, $p=0.08$). Medical errors and reporting were not associated with resilience level. The majority of respondents in all categories reported prior involvement in medical errors (high-70.0 %, intermediate-69.7 %, low-79.2 %), but most respondents stated they had never reported these errors (high-55.0 %, intermediate-60.6 %, low-83.3 %). Overall, only 50 % of residents report an outlet within their program to discuss feelings of stress and burnout.

CONCLUSIONS: There is a wide range of resilience scores amongst Internal Medicine residents with many residents without high levels of resilience. Low resilience is associated with more stress interfering with relationships, feeling inferior to peers and fewer skills to manage stress and burnout. Burnout from work is high among residents and there are not enough outlets in programs to discuss stress and burnout. In addition, although there was no association with resilience and medical errors, our results show that despite most respondents acknowledging direct involvement in medical errors, most residents never formally report these incidents. More curricula to increase resilience and address stress, burnout, and medical errors involving medical trainees are needed.

RESIDENTS' PERCEPTIONS OF THEIR HEALTH LITERACY SKILLS AND TRAINING NEEDS ACROSS SPECIALTIES Tamasy Nelson²; Lisa Altshuler¹; Colleen Gillespie¹; Mrudula Naidu¹; Alison Squires³; Shonna Yin¹; Sondra Zabar¹. ¹NYU School of Medicine, New York, NY; ²Vanderbilt University School of Medicine, Nashville, TN; ³NYU School of Nursing, New York, NY. (Tracking ID #2198469)

BACKGROUND: Low health literacy (HL) is common, particularly in underserved communities. HL deficits have been associated with patient safety issues and poor health outcomes. Provider use of HL-informed communication strategies, including plain language verbal and written communication, and use of "teach back" to confirm patient understanding, has been linked to improved patient outcomes, therefore, a "universal precautions" approach is recommended. A recent survey of medical schools found that 72 % of the 133 U.S. allopathic medical schools included HL in their curriculum, with a only a median time spent of 3 h in total (Coleman & Appy, 2012). As part of a needs assessment of residents at our institution, we surveyed residents across 7 programs to determine their previous training in HL, current practices, comfort level with HL skills and desire for further training. This allowed us to assess overall need and to identify differences by specialty.

METHODS: Data was collected from residents via an online survey (Qualtrics) during the 2013–2014 academic year. Residency programs surveyed included Emergency Medicine (EM), Internal Medicine (IM), Obstetrics/Gynecology (OB), Orthopedics (OR), Pediatrics (PED), Primary Care (PC), and Surgery (SUR). Completed responses were received from 269 residents (of 394 total), for a response rate of 68 % overall. This ranged from a 100 % response rate from OR down to 57 % from EM. HL questions for the survey were adapted from Schwartzberg et al. (2007) and Turner et al. (2009). The following domains were assessed: 1) prior HL training (1Q), 2) use of HL techniques (8Q), 3) perceived skill in key HL techniques (3Q), 4) desire for HL training (1Q). Prior HL training was assessed with a question about whether they had HL training, and if so, where they received it. Use of HL techniques was rated on a 5-point Likert scale from 1 (never) to 5 (always); techniques included teach-back, providing easy to read written materials, underlining key points on written materials. A Overall HL Use score was calculated by averaging responses (Cronbach's alpha=.88). Perceived skill in key HL techniques was, rated on a 4-point scale from 1 (not at all skilled) to 4 (very skilled); skills assessed included teach-back, choosing appropriate written materials, and converting medical terms into plain language. A HL Skills score was calculated by averaging responses

(Cronbach's alpha=.70). Finally, participants were asked to respond to open-ended questions re: what HL training they would like.

RESULTS: Sixty-five percent of residents reported prior training related to HL, with the majority of this being in medical school; educational formats used included didactics and OSCEs. Across specialties, 84 % of OR residents reported having had previous training, while IM was the lowest at 47 %. Statistically significant differences in reported Overall HL Use across programs was determined by one way ANOVA ($F(6, 268)=8.77$, $p=0.0001$). Post hoc Tukey test revealed that SUR Overall HL Use score was significantly higher than the other specialties, ($p=0.05$). No other significant differences were found. For the HL Skill score, one way ANOVA was significant ($F(6265)=3.48$, $p=0.002$). Tukey post-hoc analysis revealed that SUR was again the highest scorer, with scores significantly higher than both IM and OB ($p=0.05$). When asked what future training residents wanted, there were consistent themes across the specialties. Many residents wanted to know where to find easily accessible printed material suitable for low-literacy patients, ways to match health education literature to patients' HL levels, and pragmatic strategies for integrating HL approaches in a busy clinical setting with diverse patient populations.

CONCLUSIONS: Most residents across multiple specialties report at least some training in HL during medical school, although the extent of such training is not known. There are differences between specialties with respect to self-reported use of and comfort with HL approaches, with surgeons feeling the most prepared and internal medicine and obstetrics trainees less so. In spite of their reported skill level, all groups identified need for further HL training. Additionally, this study assessed self-report of HL skill and use. To better understand differences by specialty assessing actual HL skill and use from an observational study is planned.

RISK OF ATRIAL FIBRILLATION ACROSS THE FULL TSH RANGE: AN INDIVIDUAL PARTICIPANT POOLED ANALYSIS OF LARGE PROSPECTIVE INTERNATIONAL COHORT STUDIES Christine Baumgartner¹; Bruno R. da Costa²; Tinh-Hai Collet³; Anne R. Cappola⁴; Douglas Bauer⁴; Daniel Segna¹; Anette van Dorland¹; Carmen Floriani¹; Peter Jüni²; Graziano Ceresini²; Jacobijn Gussekloo⁶; Wendy P. den Elzen⁶; Robin P. Peeters⁷; Henry Völzke¹²; Marcus Dörr¹²; John P. Walsh⁸; Alexandra P. Bremner⁸; Massimo Iacoviello⁹; Ian Ford¹⁰; Jan Heeringa⁷; Susan R. Heckbert¹⁵; David J. Stott¹⁰; Rudi G. Westendorp⁶; Drahomir Aujesky¹; Nicolas Rodondi¹. ¹Inselspital Bern, Bern University Hospital, Bern, Switzerland; ²Institute of Social and Preventive Medicine and Clinical Trials Unit, University of Bern, Bern, Switzerland; ³University Hospital of Lausanne, Lausanne, Switzerland; ⁴University of California San Francisco, San Francisco, CA; ⁵University Hospital of Parma, Parma, Italy; ⁶Leiden University Medical Center, Leiden, Netherlands; ⁷Erasmus Medical Center, Rotterdam, Netherlands; ⁸University of Western Australia, Crawley, WA, Australia; ⁹University of Bari, Bari, Italy; ¹⁰University of Glasgow, Glasgow, United Kingdom; ¹¹University of Pennsylvania School of Medicine, Philadelphia, PA; ¹²University of Greifswald, Greifswald, Germany; ¹³DZHK (German Center for Cardiovascular Research), partner site Greifswald, Greifswald, Germany; ¹⁴Sir Charles Gairdner Hospital, Nedlands, WA, Australia; ¹⁵University of Washington, Seattle, WA. (Tracking ID #2191361)

BACKGROUND: The lower and upper limits of the optimal reference range of thyroid stimulating hormone (TSH) and optimal TSH targets in clinical guidelines remain controversial, leading to variability in the clinical management of thyroid dysfunction. Some prospective studies have found subclinical hypothyroidism to be associated with a reduced risk of atrial fibrillation (AF), while others have found an increased AF risk within the lower normal TSH reference range. Identification of modifiable risk factors and potentially reversible causes of AF is important to optimize prevention and treatment, given its significant public health burden. We aimed to assess the risk of AF across the full TSH range in prospective cohort studies participating in the International Thyroid Studies Collaboration.

METHODS: Individual participant data from seven large prospective cohort studies with measurement of thyroid function at baseline and assessment of incident AF outcomes were pooled to assess the risk of incident AF according to TSH levels. Euthyroidism was defined as TSH level from 0.45 to 4.49 mIU/l and subdivided into five categories (0.45–0.99 mIU/l, 1.00–1.49 mIU/l, 1.50–2.49 mIU/l, 2.50–3.49 mIU/l and 3.50–4.49 mIU/l). We compared the incidence of AF of all TSH groups to the reference group 3.50–4.49 mIU/l. Subclinical hypothyroidism was defined as TSH level between 4.5 and 19.9 mIU/l and subclinical hyperthyroidism as TSH level <0.45 mIU/l, both with normal free thyroxine levels.

RESULTS: Among 11,387 adults, 1064 (9.3 %) had subclinical hyperthyroidism and 900 (7.9 %) had subclinical hypothyroidism. In total, 962 individuals developed AF during follow-up. In individuals with subclinical hyperthyroidism, the risk of AF increased with lower TSH levels: age- and sex-adjusted hazard ratio (HR) 1.64 (95 % confidence interval [CI] 1.07–2.53) for a TSH level of 0.10–0.44 mIU/l and 1.71 (95 % CI 0.69–4.26) for a

TSH level <0.10 mIU/L, *p* value for trend 0.024. The risk of AF events was not increased in TSH categories within the euthyroid range, with an HR of 1.16 (95 % CI 0.86–1.56) for a TSH level of 0.45–0.99 mIU/L, HR 0.97 (95 % CI 0.73–1.28) for a TSH level of 1.00–1.49 mIU/L, HR 1.14 (95 % CI 0.89–1.46) for a TSH level of 1.50–2.49 mIU/L, and HR 1.07 (95 % CI 0.82–1.39) for a TSH of 2.50–3.49 mIU/L compared to a TSH level of 3.50–4.49 mIU/L. Subclinical hypothyroidism was not significantly associated with a lower risk of incident AF (HR 1.15 [95%CI 0.86–1.55] for TSH 4.5–6.9 mIU/L, HR 0.80 [95 % CI 0.50–1.28] for TSH 7.0–9.9 mIU/L and HR 1.29 [95%CI 0.75–2.20] for TSH 10.0–19.9 mIU/L). Excluding patients with thyroid hormone medication at baseline yielded similar results.

CONCLUSIONS: Euthyroid individuals, even those with TSH levels within the low-normal range, are not at increased risk of developing AF, whereas the risk of AF increases with lower TSH levels in patients with subclinical hyperthyroidism. Subclinical hypothyroidism is not associated with a protective effect for AF. These data do not support changing the lower or upper limit of TSH based upon the risk of AF.

SHARED SYSTEMS, PERSONAL DECISIONS: VARIATION IN MAMMOGRAPHY UTILIZATION AMONG A DIVERSE GROUP OF WOMEN AGED 40–49 YEARS. Hana Akselrod; Kathleen Fairfield. Maine Medical Center, Portland, ME. (Tracking ID #2199345)

BACKGROUND: Since 2009, the US Preventive Services Task Force (USPSTF) has recommended that physicians engage in individualized decision-making regarding starting screening mammography in women before age 50, taking into account clinical factors as well as patient values and beliefs regarding specific benefits and harms. Prior research and clinical experience suggest that such individualized decision-making can prove challenging when there are barriers of language, culture, or trust between the patient and her provider. In recent years, our area has become home to a large population of refugees and secondary migrants hailing from areas as diverse as East Africa, the Middle East, Central Asia, and Latin America. Consequent to this demographic transition, our health system now serves a diverse population of patients, with cultural and socioeconomic barriers to optimal preventive care and shared decision making (SDM). At the same time, the integration of a system-wide electronic health record (EHR) affords an unprecedented opportunity to examine screening practices and SDM across populations. We therefore designed a study aiming (1) to describe patterns of mammography utilization in women aged 40–49 receiving primary care through in our network; and (2) to assess whether SDM took place with equal frequency among English-speaking versus non-speaking patients.

METHODS: After human subjects review, we queried the EHR to identify a retrospective cohort of women aged 40–49 who were seen for primary care visits in 2013. The primary outcome was incidence of screening mammography (performed or ordered during the study period). Covariates of interest included demographic variables including ethnicity, primary language, insurance type, zip code, and clinical site; and pertinent history affecting risk of breast cancer (medical, family, and social). Descriptive and analytical statistics were obtained using SAS software to evaluate relationships between covariate and outcome variables, and to identify disparities between demographic groups. Next, a systematic chart review will be conducted on a randomly selected subsample using a scoring system to assess documentation of SDM before the ordering of mammography.

RESULTS: Of a total of 3343 patients meeting inclusion criteria, 1265 (38 %) of the women had a mammogram in 2013. Compared to patients identified as White Non-Hispanic, who accounted for 87 % of the population, mammography rates were significantly higher among patients who self-identified as Asian (52 % vs. 38 %; *p*=0.006) and as Multiracial/Other (71 % vs. 38 %; *p*<0.001). Among English-speaking patients, mammography screening rate was lower compared to patients whose primary language was not English (38 % vs. 47 %; *p*=0.005). Never-smokers had lower screening rate (20 %) compared to either current (27 %) or former (45 %) smokers (*p*<0.001). Among women with public insurance (Medicare/Medicaid), rates were lower compared to those with self-pay or private insurance (30 % vs. 40 %, *p*<0.001). There was wide variation in mammography rates between the ten ambulatory sites, ranging from 29 to 50 %. Systematic chart reviews are being performed to determine whether SDM was documented.

CONCLUSIONS: Mammography screening continues to be performed quite commonly among women in their 40s in our patient population, at rates roughly comparable to the nationally reported figures (reported between 40 and 50 % in 2011 NHANES). On initial analysis, screening rates in our patients varied widely by racial/ethnic group, national origin, insurance type, smoking, and clinic location. We have found that specific racial/ethnic minority status and lack of English fluency in our patient population were associated with higher rates of mammography during the study period. Additional reviews are being conducted to explore the role of SDM in the clinical encounters preceding the screening, to assess whether the higher screening rates observed in some patient groups are

the outcomes of engaging in SDM, or on the contrary may indicate a disproportionate lack of engagement.

SKILLS FOR IDENTIFYING A STRUGGLING COLLEAGUE: I CANNOT TAKE THIS ANY MORE! Sondra Zabar¹; Russell Burman¹; Mark Hochberg¹; Donna Phillips¹; Amara Shaker-Brown¹; Kathleen Hanley¹; Adina Kalet²; Colleen Gillespie¹. ¹NYU School of Medicine, New York, NY; ²New York University School of Medicine, New York, NY. (Tracking ID #2198823)

BACKGROUND: House staff generally receive little training in recognizing a colleague at risk. Even if they do realize a colleague needs help, there is reluctance to recommend or seek care because of the stigma surrounding emotional distress and the fear of being labeled as “incompetent” or “weak”. Residency training has been documented to be a stressful time. There is a need to change the culture in training programs and make sure all residents have the skills to address these issues and understand resources that are available.

METHODS: We designed an OSCE station to assess a resident’s ability to recognize substance abuse and depression in a colleague, to assess the acuteness of the situation and to make a plan. Skills were assessed in a 10-min case by “Standardized Intern” as part of the annual multi-station OSCE for 2 surgical residency programs and one medicine program. The learner was tasked with “giving sign-out” to an intern (Standardized Healthcare Professional) coming on-service with a reputation for being disorganized and a loner. The SHP is scripted to make clear comments about how difficult residency is and admits to being stressed. Case background includes being new to the city, stressed about residency and meeting criteria for major depression and risky alcohol use. A checklist was created to assess general communication and case specific skills. Domains included: depression and substance use screen, current life situation assessment, and follow-up. Item response options were: not done, partly done, and well done, each with descriptive behavioral anchors to enhance rating reliability.

RESULTS: Sixty residents performed the case: 37 surgical and 24 medical. Almost all residents checked in with the intern about their emotional state (49/60; 82 %). Eleven percent (1 surgical and 6 medical residents) fully screened for depression with 2 question screen but a third asked generally about depression (21/60). Almost half did not ask about depression (28/60). Ten percent (6 medical residents) asked about suicidal ideations, 8 surgical residents asked if he thought about hurting himself and 46/60 did not ask about suicide. Over half of the surgical residents asked about alcohol use (20/37) compared to only less than a third of medical residents (7/23). A quarter (15/60) of the residents attempted to identify a person for the intern to talk to, either outside or inside the program. For follow up, 75 % (45/60) personally included themselves in the intern’s support system and 65 % (39/60) directed them toward specific resources (e.g. GME psychiatrist, program director, or outside resource).

CONCLUSIONS: We identified a wide range of performance across three programs but most importantly this case provided an opportunity for experiential learning and an open discussion of an important topic. This data will help us design a curriculum on resident wellness.

SOCIAL SUPPORT AND ITS RELATIONSHIP TO ADVANCE CARE PLANNING Phuong Luu¹; Lucy Meoni²; Marie Nolan³; Joseph J. Gallo². ¹Johns Hopkins University School of Medicine, Baltimore, MD; ²Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD; ³Johns Hopkins University School of Nursing, Baltimore, MD. (Tracking ID #2193025)

BACKGROUND: The Institute of Medicine’s recent report on “Dying in America” highlights the urgent need to focus on advance care planning to improve end-of-life care. Social support is an important component in understanding how patients approach advance care planning, however, limited studies have focused on this association. Thus our study’s aim was to assess whether older adults were more likely to complete an advance directive or have end-of-life discussions with their family and/or friends if they had strong social support.

METHODS: We conducted a cross-sectional study using the 2012 Precursors Study questionnaire. The Precursors Study is a cohort study of medical students beginning in the 1960’s. Social support was defined using the Medical Outcomes Study (MOS) Social Support Survey, which is further divided into four subscales of emotional, tangible, affective and positive social support. The overall social support score and each of the four subscales total scores were averaged and generated into binary variables. Respondents who had an average score of 5 within each subscale or across the overall social support scale, were assigned a 1 for that subscale or total score. All others were assigned a zero. The outcomes assessed were self-reported completion of advance directive or reporting having had an end-of-life discussion with family and/or friends. Five multivariate logistic models were done for the overall support scale and each of the subscales, respectively. Each model was adjusted for age, marital status, retirement status, personal preferences for

end-of-life care, and preferences regarding doctor's input and loved ones' input in end-of-life care.

RESULTS: Of those who answered the question regarding advance directive completion ($N=449$), 85 % reported having an advance directive. Of those who answered the question regarding end-of-life discussion ($N=452$), 94 % reported having had an end-of-life discussion with their family and/or friends. Tangible support (adjusted OR 2.00, 95 % CI 1.13–3.57) and positive social support (adjusted OR 2.49, 95 % CI 1.38–4.50) were significantly associated with advance directive completion. Affective support (adjusted OR 2.92, 95 % CI 1.18–7.22) was significantly associated with reported having had an end-of-life discussion with family and/or friends. Though the remainder of the associations were not statistically significant, they all showed trend towards greater social support, regardless of the type, being related to completing an advance directive or having an end-of-life discussion.

CONCLUSIONS: Our results indicate that specific types of social support are associated with advance care planning. Individuals reporting tangible, affective and positive social support had greater than two-fold odds of reporting advance care planning. To our knowledge, this is the first study to utilize the MOS social support survey to understand the role of social support in advance care planning. These findings indicate that approaches to advance care planning should incorporate discussions regarding the patient's social support.

THE 5 PHENOTYPES OF HIGH COST PATIENT Sang Been N. Hong², Noah Whitman¹, Nirav Vakharia¹, Michael B. Rothberg¹. ¹Cleveland Clinic, Cleveland, OH; ²Cleveland Clinic, Cleveland Heights, OH. (Tracking ID #2190027)

BACKGROUND: In order to design cost reduction strategies, it is important to understand the resource utilization patterns of those patients who drive the majority of healthcare costs. High cost patients may use resources in diverse ways. We used cluster analysis to identify profiles of utilization among the high cost population.

METHODS: We utilized a retrospective observational design. Using the Quality Resource and Use Report distributed by the Centers for Medicare and Medicaid Services, we identified all Medicare patients who were hospitalized exclusively at Cleveland Clinic Health System (CCHS) hospitals and received ≥ 90 % of their primary care services at a CCHS facility in 2012. We defined high-cost patients as the 10 % of the population with the highest sum of direct and indirect costs at a CCHS facility, based on CCHS internal cost accounting data. Total admissions, inpatient days, ICU days, inpatient surgeries, ED visits, and outpatient visits were obtained from the electronic medical record. We used the Agency for Healthcare Research and Quality Clinical Conditions Software to group ICD-9 diagnosis and procedures codes. Based on data review and clinical judgment, we used the k-medoids, a clustering algorithm that robustly organizes a heterogeneous dataset into a pre-determined number of distinct groups, to create five clusters. For each cluster, odds ratios of 24 high cost conditions were calculated in comparison to the high-cost population mean prevalence. Statistical significance was calculated by logistic regression.

RESULTS: Our high-cost sample included 1486 patients; 55 % were male, and median age was 68 (IQR 15). The "ambulatory" cluster contained patients with few admissions or ED visits (Table). They were most likely to have cancer and chemotherapy. "Surgical" patients generally had one expensive surgical admission. They had the highest odds of osteoarthritis and procedure/device complications; 61 % of these patients with osteoarthritis received arthroplasty. "Critically Ill" patients required intensive care; they had the highest inpatient as well as overall costs. They had higher odds of heart failure and cardiac arrhythmia and arrest. The "Frequent Care" cluster had frequent admissions, ED visits, and outpatient visits. Psychiatric disorders and COPD/asthma were most characteristic. "Mixed Utilization" patients had a mixture of admissions, ED visits, primary care visits, and specialist visits. They were not characterized by specific diagnoses, but complications of medical care and procedures were less common in this cluster.

CONCLUSIONS: Using cluster analysis, we identified subgroups of high cost patients exhibiting distinct utilization patterns. Efforts to reduce cost may benefit from a targeted approach that addresses the diversity of high cost utilization.

	Ambulatory Care	Surgical	Critically Ill	Frequent Care	Mixed Utilization
Cluster size (n)	415	297	164	281	329
% Male	52%	53%	60%	49%	64%
Median Age	68 (14)	68 (10)	69 (23)	67 (23)	68 (14)
Admissions	0 (0)	1 (1)	2 (2)	2 (1)	1 (0)
Inpatient Days	0 (0)	5.8 (6.1)	19.4 (18.6)	11.8 (10.0)	4.8 (3.6)
ICU Days	0 (0)	0 (0.2)	4.0 (4.3)	0 (0)	0 (0)
Inpatient Surgeries	0 (0)	2 (1)	0 (1)	0 (0)	0 (0)
ED Visits	0 (1)	0 (1)	2 (3)	3 (3)	1 (2)
PCP visits	2 (3)	2 (4)	2 (4)	3 (5)	3 (4)
Specialist Visits	14 (13)	9 (8)	10 (12)	13 (13)	11 (10)
Ancillary Visits	10 (13)	12 (13)	9 (17)	13 (18)	9 (14)
Inpatient Costs	\$0	\$27,851	\$48,019	\$22,453	\$12,611
Outpatient Costs	\$30,266	\$10,645	\$12,106	\$16,564	\$15,794
Characteristic Conditions	Cancer (3.0)**	Osteoarthritis (1.6)**	Heart Failure (2.3)**	Psychiatric Disorders (2.3)**	Medical Complications (0.7)*
*= p<0.05 **= p<0.001	Chemotherapy (1.9)**	Procedure Complication (1.4)*	Cardiac Arrhythmia (2.1)**	COPD (2.1)**	Procedure Complication (0.6)*

Table. Patient characteristics, median utilization (with interquartile range), and odds-ratios of characteristic conditions.

THE EFFECT OF A PAYER-MANDATED DECREASE IN BUPRENORPHINE DOSE ON RELAPSE RATES OF PATIENTS WITH OPIOID DEPENDENCE, A NATURAL EXPERIMENT. Anthony Accurso. Johns Hopkins Bayview Medical Center, Baltimore, MD. (Tracking ID #2197277)

BACKGROUND: Although office-based buprenorphine therapy is now a decade old, the optimal buprenorphine maintenance dose is still not known. Under-dosing may lead to

craving and use of illicit drugs, while providing higher than needed doses may contribute to pill-diversion. In January 2013, a major local Medicaid-insurance organization stopped covering buprenorphine doses greater than 16 mg/day without prior authorization. This policy led to a subset of patients on stable buprenorphine therapy of higher doses being forced to decrease their dose to 16 mg/day. This event created conditions for a natural experiment in which to study the effects of a mandated dose decrease. The objective of the study was to assess whether patients with prior stability on higher doses of buprenorphine had greater relapse rates after this payer-imposed dose decrease.

METHODS: This study was a retrospective cohort study of laboratory test results and charts from patients at an urban, primary-care clinic in Baltimore with academic affiliation. The study population was comprised of patients of adults with a diagnosis of opioid dependence who had been maintained on buprenorphine from September through December 2012. Urine drug testing results for the entire practice were obtained from the period of August 2012–April 2013. Charts were reviewed to determine each subject's insurer, buprenorphine dose, and other prescribed medications. Cohorts were then created with an experimental group comprised of patients who had experienced a dose decrease, and control groups based on insurer and buprenorphine dose, as described in Table 1. Urine drug testing was aggregated by test date and defined as “pass” or “fail” with “pass” defined as the presence of buprenorphine and absence of cocaine, opiates, methadone or nonprescribed benzodiazepines. Pass rates were calculated for each patient in the pre and post period of the study, which were then compared for each patient with the Wilcoxon Signed Rank Test.

RESULTS: We identified 410 patients in our practice who had been prescribed buprenorphine during the study period, of whom 310 met study criteria. Of those, 98 patients experienced a payer-mandated buprenorphine dose decrease, and were assigned to group 1. Overall pre-decrease urine pass rate by patient was 75 %, and post-decrease urine pass rate was 66 %, ($p=0.030$). This analysis was repeated among three other control groups, none of which showed a significant change in urine pass-rate.

CONCLUSIONS: Our study suggests that mandated limits on buprenorphine dose may lead to increases in other drug use, at least in the short term. This data can inform policy decisions about the proper maintenance dose of buprenorphine. Of note, while a mandated dose-decrease to 16 mg had a statistically significant negative effect on treatment success, the effect size was small. Many of the patients in the practice tolerated the switch and acclimated to the dose decrease. Further research is needed on the optimal dosing of buprenorphine.

Description of Group Attributes and Pre/Post-Period Urine Pass Rates

	High Dose to Low Dose Imposed by Insurer	Low Dose, Same Insurer	High Dose, Other Insurer	Low Dose, Other Insurer
N	98	78	76	68
Mandated Dose Decrease	Yes	No	No	No
Insurance	Priority Partners	Priority Partners	Other Insurance	Other Insurance
Initial Daily Buprenorphine Dosage	>16 mg	≤16 mg	>16 mg	≤16 mg
Pre-Period Pass Rate (%)	74.5	68.5	78.5	67.9
Post-Period Pass Rate (%)	65.9	63.3	80.1	65.1
<i>p</i> -value	0.030	0.203	0.659	0.307

THE IMPACT OF A HEART FAILURE PATHWAY IMPLEMENTATION: AN INSTITUTIONAL REVIEW Charles Allderice²; Neal Mehta, MD²; William Burkhardt²; Nicole Simmons, APN²; Laura Bullock, PharmD²; Eric Heidele, PhD²; Natalie Varner, PhD²; Mark Rasnake¹. ¹UT Medical Center Knoxville, Knoxville, TN; ²University of Tennessee Medical Center-Knoxville, Knoxville, TN. (Tracking ID #2195792)

BACKGROUND: Heart failure is a primary diagnosis on admission in over 1 million cases annually and its prevalence is expected to rise 46 % by 2030 as survival after diagnosis has increased. All-cause re-hospitalization can reach as high as 25 % within one month, with case fatality rates being as high as 10.4 %. Our facility created a multidisciplinary clinical pathway to facilitate the provision of evidenced based care for heart failure patients. To compare the efficacy of this pathway versus standard care, we examined the primary endpoints of length of stay, 30-day readmission rate, and all-cause mortality for patients admitted with a primary diagnosis of heart failure. Secondary endpoints include evidence based heart failure medications administered upon discharge.

METHODS: All adults admitted with a primary diagnosis of heart failure to our facility between January 1, 2014 and June 30, 2014 were eligible for the study. Subjects were identified using ICD-9-CM heart failure codes. Baseline characteristics according to admission history and physicals and echocardiogram reports were compared. Adverse events including acute kidney injury and hyperkalemia were reviewed. Those placed on hospice or admitted primarily for other interventions were excluded.

RESULTS: A total of 310 patients were admitted with heart failure between January and June 2014, with 308 being included in the study. 133 (43 %) patients were managed through use of a pathway versus 175 (57 %) who underwent standard care. Length of stay remained equivalent at 5.64 days for both sets of patients, with a p -value of 0.99. There was a trend toward lower 30-day readmission (26 versus 23) and all-cause mortality (12 versus 4) with use of a pathway, however, the results did not reach significance. (p -value 0.64 and 0.14 respectively). Adverse events during the hospitalization including acute kidney injury and hyperkalemia showed no statistical difference (p -value 0.65 and 0.81 respectively). Secondary outcomes regarding evidence based heart failure medications on discharge also showed no statistical difference.

CONCLUSIONS: Among patients admitted with a primary diagnosis of heart failure, 43 % were managed with use of a pathway. Baseline characteristics and adverse events were compared between both groups and showed no significant difference. Pathway implementation did not reduce 30-day readmission rate, all-cause mortality, and length of stay, with length of stay remaining unchanged between both groups. None of these findings reached significance among unadjusted comparisons. Secondary outcomes regarding medication use at discharge according to evidence based medication guidelines also showed no difference with use of a pathway versus standard care. Our institution's compliance with heart failure core measures was 96.6 % prior to pathway implementation, potentially limiting the amount of benefit achievable through pathway use. It is also unclear of the impact of this pathway after discharge. Such entities as nursing patient education and appropriate outpatient follow up were not taken into account. This use of the pathway may have direct positive results and will need further review in future studies.

THE RELATIONSHIP AMONG OPIOID USE, HIV, AND ACCIDENTAL DEATH: IS IT IN THE EYE OF THE BEHOLDER? William Becker²; Janet P. Tate⁶; Eva J. Edelman⁶; Julie Gaither³; Kathleen Akgun²; Declan Barry³; Stephen Crystal⁴; Adam Gordon¹; Jessica S. Merlin²; Robert D. Kerns²; Amy C. Justice⁶; David A. Fiellin⁶. ¹University of Pittsburgh and VA Pittsburgh Healthcare System, Pittsburgh, PA; ²VA Connecticut, West Haven, CT; ³Yale University, New Haven, CT; ⁴Rutgers University, New Brunswick, NJ; ⁵University of Alabama at Birmingham, Birmingham, AL; ⁶Internal Medicine, Yale University, New Haven, CT. (Tracking ID #2198782)

BACKGROUND: Opioid-related accidental deaths, including unintentional overdose, have increased markedly in the U.S. Several large observational studies have demonstrated increased risk of opioid-related accidental death among those with serious mental illness, substance use disorders and pain, conditions that are disproportionately prevalent among individuals with HIV. Furthermore, as individuals with HIV live longer, they may be more vulnerable to harm from opioid use. To understand the relationship among opioid use, HIV status and accidental death, exposures and outcomes need to be determined in an unbiased manner. Recognizing that assigning cause of death is challenging and may be subject to bias, we sought to examine whether the relationship between opioid use and accidental death, including unintentional overdose death, varied by HIV status.

METHODS: Our data source was the Veterans Aging Cohort Study (VACS), a cohort of HIV-infected and matched uninfected Veterans consented for prospective, recurrent surveys on alcohol and drug use (including heroin and non-medical use of prescription opioids), among other health behaviors, with survey data linked to the electronic medical record (e.g. pharmacy data). Our analytic sample consisted of VACS decedents from 2002–2009 who, prior to death, responded to at least one follow-up survey. We linked VACS records with the National Death Index cause of death file, which lists underlying and contributory causes of death as reported by the medical examiner or coroner. Based on ICD-10 codes, we categorized cause of death, either underlying or contributory, as accidental (e.g. motor vehicle crash), unintentional overdose, or other, and categorized decedents as having had opioid use or not based on VACS survey self-report. Stratified by decedent's HIV status, we calculated the ratio—with and without opioid use—of the proportion of decedents coded as accidental death and, separately, calculated the ratio—with and without opioid use—of the proportion of decedents with unintentional overdose death. For comparison, we examined different measures of opioid use (i.e. self-reported heroin use and pharmacy record of opioid receipt).

RESULTS: The sample consisted of 738 HIV-infected and 321 uninfected decedents. Accidental death and unintentional overdose death were 9.5 and 2.6 % of total deaths, respectively, with HIV-infected decedents less likely to be coded as having an accidental death (8.1 % vs. 12.8 %, $p<.001$) and equally likely to be coded as unintentional overdose death (2.5 % vs. 2.8 %, $p=.322$). Opioid use was equally likely in decedents with and without HIV (24 % vs 26 %; $p=.587$). As depicted in the Table, among HIV-infected decedents, the ratio of opioid use vs. non-use status was 1.0 ($p=.821$) for those coded as having an accidental death and 1.7 ($p=.269$) for unintentional overdose death. However, uninfected decedents with opioid use were 4 times as likely to be coded as having an accidental death than those without opioid use ($p<.001$) and were 6.4 times as

likely to be coded as having an unintentional overdose death than those without opioid use ($p=.003$). Patterns were similar regardless of measure of opioid use.

CONCLUSIONS: While opioid use was equally likely among decedents with and without HIV, the non-differential coding of accidental and unintentional overdose death among HIV-infected respondents with and without opioid use suggests a potential misclassification bias away from coding cause of death as opioid-related. Caution should be used in interpreting accidental and unintentional overdose death data among patients with life-limiting, chronic conditions. Future efforts to improve the validity of cause of death classification may be warranted to promote better understanding of harms of opioid treatment in vulnerable populations.

Self-Reported Opioid Use and Cause of Death by HIV status

	HIV (+) n=738			HIV (-) n=321		
	Opioid use	No opioid use	Ratio (p value)	Opioid use	No opioid use	Ratio (p value)
Decedents, n	191	547		78	243	
Accidental death; n, (proportion)	15 (7.9)	4 5 (8.2)	1 . 0 (.82)	2 3 (29.5)	1 8 (7.4)	4 . 0 ($<.001$)
Unintentional overdose death; n, (proportion)	7 (3.7)	1 2 (2.2)	1 . 7 (.27)	6 (7.7)	3 (1.2)	6 . 4 (.003)

THE RELATIONSHIP BETWEEN PRIMARY CARE ORGANIZATIONAL PROCESSES AND PATIENT-REPORTED CARE EXPERIENCES Jaya Aysola¹; Rachel M. Werner². ¹University of Pennsylvania, Philadelphia, PA; ²University of Pennsylvania and Philadelphia VA, Philadelphia, PA. (Tracking ID #2199159)

BACKGROUND: There is increasing emphasis on the use of patient-reported experience data in the evaluations of outpatient primary care practice and provider performance. Yet there remains an insufficient understanding of what aspects of primary care organizational processes relate to patient primary care experiences. Therefore, we evaluated the relationships between organizational processes and patient-reported experiences in the network of University of Pennsylvania primary care practices.

METHODS: We analyzed visit data from patients ($n=8356$) collected between January 2012 through July 2014 at all University of Pennsylvania Health System affiliated adult primary care practices with three or more providers ($n=22$). We first surveyed practice managers at these 22 sites using a previously validated scale from 0 to 100 to quantify practice adoption of organizational processes across six domains: access and communication; patient tracking and registry; care management; test referral tracking; quality improvement; and external coordination. This practice-level data was then linked to data on patient experience and demographics. Experience was measured using visit-triggered survey data generating a patient experience score (0 to 100). To investigate the relationship between practice structural processes and patient experience, we used generalized estimating equations (GEE) with an exchangeable correlation structure to account for patient clustering by practice. In our multivariate models we accounted for practice location, practice patient panel size, number and type of providers, as well as patient demographics and clinical comorbidities (Charlson Comorbidity Index (CCI)). To determine if relationships between practice processes and patient experiences varied by the degree of patient comorbidity, we performed the above models stratified by categorical CCI (0, 1, 2, >2).

RESULTS: The mean scores (SD) across the 22 practices for the six domains of organizational processes were as follows: 74.8 (10.2) for access and communication; 67.5 (11.6) for patient tracking and registry; 53.8 (11.3) for care management; 37.2 (10.5) for test referral tracking; 48.8 (9.6) for quality improvement; and 74.5 (12.7) for external coordination. Of the 8356 patients in the study, 64 % were female, 24 % were Black, 5.3 % had Medicaid, 6.3 % had multiple chronic conditions ($CCI>2$) and the mean age (SD) was 57 (17.5). The patient experience mean score (SD) was 87.4 (13.6). Amongst the entire patient sample in multivariate models, there were no statistical significant associations between any practice adopted processes and patient experience. Amongst a subset of patients with comorbid conditions ($CCI>2$), there were statistically significant positive associations between specific practice processes and overall patient experience and key aspects of patient experience, even after adjusting for a robust set of patient, provider, and practice characteristics. For example, a 10-point higher practice score in patient tracking

and registry was associated with a 1.8 percentage point higher score in overall patient experience (95 % CI, 0.3, 2.0; $p=0.007$), as well as a 1.5 percentage point higher score in patient experiences with access (95 % CI, 0.2, 2.8; $p=0.02$). In addition, a 10-point higher score care management was associated with a 2.4 percentage point higher score in patient experiences with access (95 % CI, 1.6, 3.2; $p<0.001$).

CONCLUSIONS: Amongst all primary care patients in our sample, we found no significant associations between practice adoption of organizational processes and patient experience in multivariate models. Understanding what practice processes if any influence patient experiences of care is paramount to improving practice and provider performance in this area. Amongst the subset of patients with comorbidities ($CCI>2$), we found that organizational processes across several domains were positively associated with patient care experiences. These findings suggest that extensive practice efforts to adopt well-promoted organizational processes do appear to be associated with better care experiences in a subset of patients with multiple chronic conditions and that practices may benefit from targeting current efforts in practice redesign towards those patients.

THE ROLE OF CONTINUITY IN HOSPITAL CARE FOR READMITTED COLON CANCER PATIENTS Phuong Luu²; Tanvir Hussain²; Hsien-Yen Chang¹; Elizabeth Pföh²; Craig E. Pollack². ¹Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD. (Tracking ID #2193016)

BACKGROUND: Readmissions may reflect a failure to provide care and/or to coordinate care prior to discharge, resulting in increased cost and potentially poorer outcomes. Identifying how to best care for this high risk group during readmissions to contain further cost and prevent poor outcomes has received relatively little attention. Our study seeks to evaluate whether mortality and costs differ based on whether patients are readmitted to the hospital they were initially discharged from or to a different hospital. We chose colon cancer as an important example; colon cancer is a leading cause of cancer mortality, its treatment often requires patients to see multiple different types of specialists, and efforts have focused on improving continuity of care for patients with cancer.

METHODS: We conducted a retrospective analysis using SEER-Medicare linked data of patients with stage I-III colon cancer between 2000 and 2009 who had surgery within 3 months of diagnosis and were readmitted within 30-days of discharge from their surgical hospital. Our independent variable was whether a patient was readmitted to the same hospital as their initial discharge or a different hospital. Our primary outcome was all-cause mortality (censor date: 12/31/2011). Secondary outcomes included colon cancer specific mortality and costs of care in the 12-months following diagnosis. We used Cox proportional hazards to assess all-cause mortality and subhazards for colon cancer specific mortality; we employed hierarchical generalized linear models for 12-months costs. For each model, we used a propensity-score weighted doubly robust approach to adjust for patient, physician, and hospital characteristics.

RESULTS: Approximately 23 % ($N=769$) of the 3399 patients were readmitted to a different hospital than where they were initially discharged. Those readmitted to a different hospital tended to be older and have higher comorbidity burden compared to those readmitted to their initial discharge hospital. After adjustment, there was no difference in either all-cause or colon cancer specific mortality for patients readmitted to a different hospital compared to those readmitted to the same hospital (adjusted Hazard Ratio [HR] 1.09, 95 % Confidence Interval [CI] 0.97–1.24 for all-cause mortality; adjusted HR 0.98, 95 % CI 0.56–1.73 for colon cancer specific mortality). However, costs of care were significantly higher among patients readmitted to a different hospital (the adjusted costs difference was \$13,364, 95 % CI \$742–\$28,954) for 12-months after colon cancer diagnosis.

CONCLUSIONS: Almost a quarter of patients were readmitted to a hospital different from which they were discharged; this may pose a challenge to providing continuity in care as these patients are more likely to be older and have more comorbidities and may increase health care expenses. Creating continuity between episodes of hospital care may be a strategy for managing the complex care of cancer patients.

THE USE OF TABLET TECHNOLOGY BY ELDERLY IN HEALTH CARE SETTINGS—IS IT EFFECTIVE AND SATISFYING? A SYSTEMATIC REVIEW AND META ANALYSIS Chethan Ramprasad²; Leonardo Tamariz¹; Yanira Garcia-Barcena²; Ana Palacio². ¹University of Miami, Miami, FL; ²University of Miami Miller School of Medicine, Miami, FL. (Tracking ID #2198013)

BACKGROUND: Tablet technologies such as iPads have become ubiquitous in today's society. The use of these technologies by the elderly in clinical settings has the potential to increase clinical effectiveness as well as satisfaction. Appropriate use may reduce health care costs, especially for chronic conditions. The objective of the current study is to

systematically review, appraise, and summarize the evidence of the impact of tablet technology on clinical effectiveness and satisfaction in cross-sectional, pre/post, and randomized controlled trials.

METHODS: A comprehensive literature search was conducted of Pubmed, Scopus, CINAHL through July 2014 using keywords such as 'iPads', 'tablet technology', 'elderly' and 'health promotion.' We included randomized control trials, cross sectional, and pre/post studies. We defined satisfaction to include direct ratings of satisfaction as well as indirect ratings of satisfaction such as helpfulness, completion rates, and usability. We defined effectiveness as any improved health outcome including memory scores, blood pressure control, medication error reduction, number of steps per day, and gait speed. To calculate the pooled prevalent satisfaction we used the inverse variance method. To calculate effectiveness we used DeSirmonian and Laird method. This reported the standardized mean difference (SMD) for both intervention and control groups between two measurements before and after the intervention in randomized studies.

RESULTS: Our search strategy yielded 265 abstracts. We excluded 250 on abstract level and selected 25 for full-text review. We included a total of 9 studies (3

randomized controlled trials, 3 cross-sectional, 3 pre/post) with a median methodological quality of 26 out of 31 for cross-sectional and pre/post studies and 34 out of 37 for randomized control trials. There were a total of 517 subjects. The 9 studies included interventions of medication self-management, post-surgery education, memory retention, speech rehabilitation, and exercise promotion. The mean age was 70.07 (2.83). Common conditions among patients included diabetes, dementia, aphasia, and COPD. The 9 studies took place in the United States with the exception of one each in Spain, Switzerland, Australia, and South Korea. The pooled prevalence of satisfaction was 76 %; 95 % CI 21–100. The SMD for the intervention group was -0.22 ; 95 % CI -0.49 to 0.04 $p=0.09$ and the SMD for the control group was -0.014 ; 95 % CI -0.16 to 0.13 $p=0.85$.

CONCLUSIONS: The use of tablet technology by the elderly is associated with high satisfaction. There was a trend towards the improvement of health behaviors such as medicine self-management, memory retention, and exercise promotion. Given high satisfaction, there is strong potential for increased effectiveness for tablet technology use in patient education and rehabilitation as well. More studies should be conducted for further evaluation of such technology interventions.

	Article	Study Design	Intervention (purpose of tablet technology)	Time of Exposure	Study Objective	Direct Satisfaction Measurement	Helpfulness	Completion Measurement	Usability Measurement	Effectiveness Measurement
1	Mira	Randomized controlled trial	Medication self management with ALICE app	3 months	Design, implement, and assess effectiveness of medical self management app (ALICE)	8.5/10 satisfaction rating	88% felt program improved management			MMAS score Intervention: +0 Control: +0.1 Systolic BP Intervention: -2 Control: +3.2 Medication error Intervention: - Control: -1 Missed doses Intervention: - Control: +10
2	Neafsey	Randomized controlled trial	Medication self management	9 weeks	Design, implementation, and effectiveness of medical self management app	4.2/ 5 satisfaction rating				Percentage not : Target BP Intervention: -8 Control: -1.6
3	Lim	Cross-sectional	Leisure and reprieve for caretakers	1 week	Assess effectiveness of tablet program				48% reported easy to use	
4	Cook	Cross-sectional	Post surgical app for "just in time" post surgical education	5 days	Introduce patient education program, assess ease of use			84% completion rate		
5	Han	Pre/ post	Improving memory retention	4 weeks	Assess effectiveness of tablet app in memory retention	8/10 satisfaction rating	71.4% felt it was helpful			Word memory sc (intervention) Pre: +16 Post: +17.9
6	Kurland	Pre/ post	Improving speech technique	6 months	Assess effectiveness and satisfaction of tablet app in aphasia rehabilitation			Completion rate: 5/8		
7	Holland	Cross-sectional	Tele-rehabilitation	8 weeks	Assess feasibility, acceptability, and satisfaction of rehabilitation app			Completion rate: 5/8	94% usability	
8	Bickmore	Randomized controlled trial	Exercise regiment promotion: pedometer app	1 year	Assess effectiveness and satisfaction of exercise app	6/7 satisfaction rating	80% had incentive to walk			Steps Intervention: +3 Control: -270
9	Silveira	Pre/post with control	Active lifestyle promotion	12 weeks	Assess effectiveness and satisfaction of exercise app		91% felt motivated			1. Gait speed (preferred) Intervention: +0 Control: +0.1 2. Gait speed (Fast) Intervention: +0 Control: +0.12

Table 2. Study design, intervention, setting, time of exposure, and objective

TIOTROPIUM RESPIMAT®: CONTROL IN SYMPTOMATIC ASTHMA Kevin Murphy¹; William Berger²; Michael Engel³; Hendrik Schmidt⁴; Petra Moroni-Zentgraf⁵; Huib A. Kerstjens⁵. ¹BTNRH, Boys Town, NE; ²Southern California Research Center, Mission Viejo, CA; ³Boehringer Ingelheim Pharma GmbH & Co. KG, Ingelheim am Rhein, Germany; ⁴Boehringer Ingelheim Pharma GmbH & Co. KG, Biberach an der Riss, Germany; ⁵University of Groningen, Groningen, Netherlands. (Tracking ID #2194847)

BACKGROUND: The goal of asthma treatment is to achieve control and minimize future risk. Here we assess the efficacy of once-daily tiotropium Respimat® add-on to inhaled corticosteroid (ICS)±long-acting β_2 -agonist (LABA) maintenance therapy in patients with symptomatic asthma: lung function, asthma control, and asthma worsening data are presented.

METHODS: Data were evaluated from four Phase III, randomized, double-blind, placebo-controlled, parallel-group trials. PrimoTinA-asthma® (NCT00776984/NCT00772538): once-daily tiotropium Respimat® 5 µg or placebo Respimat® add-on to high-dose ICS (≥800 µg budesonide or equivalent) plus a LABA in adults over 48 weeks; MezzoTinA-asthma® (NCT01172808/NCT01172821): once-daily tiotropium Respimat® 5 µg or 2.5 µg, twice-daily salmeterol hydrofluoroalkane metered-dose inhaler 50 µg, or placebo (identical devices in a double-dummy protocol) add-on to medium-dose ICS (400–800 µg budesonide or equivalent) in adults over 24 weeks. Lung function was assessed at 24 weeks as peak forced expiratory volume in 1 s (FEV₁) within 3 h post-dose (peak FEV_{1(0-3h)}) and trough FEV₁. Asthma symptoms and control were assessed using the seven-question Asthma Control Questionnaire (ACQ-7) as responder rate (percentage

of patients with minimally important change of ≥0.5). Time to first episode of asthma worsening (defined as a progressive increase in symptoms, or a ≥30 % decrease in best morning peak expiratory flow from the patient's mean morning peak expiratory flow for ≥2 consecutive days) was also assessed.

RESULTS: Overall, 3012 patients were treated (PrimoTinA-asthma®, *n*=912; MezzoTinA-asthma®, *n*=2100). Tiotropium Respimat® provided statistically significant and sustained improvements in both peak FEV_{1(0-3h)} (all *p*<0.05) and trough FEV₁ (all *p*<0.01) responses compared with placebo. A higher proportion of patients achieved an ACQ-7 response with tiotropium Respimat® compared with placebo (Table). Risk of asthma worsening was reduced with tiotropium Respimat® compared with placebo: 31 % risk reduction [RR] with 5 µg (hazard ratio [HR] 0.69; 95 % confidence interval [CI] 0.58, 0.82; *p*<0.001) in PrimoTinA-asthma® over 48 weeks; 13 % RR with 5 µg (HR 0.87; 95 % CI 0.69, 1.08; *p*=0.211) and 34 % RR with 2.5 µg (HR 0.66; 95 % CI 0.52, 0.84; *p*<0.001) in MezzoTinA-asthma® over 24 weeks. The incidence of adverse events (AEs) was balanced between the treatment groups in all trials: PrimoTinA-asthma®, 73.5 and 80.3 % for tiotropium Respimat® 5 µg and placebo Respimat®, MezzoTinA-asthma®, 57.3 %, 58.2 %, and 59.1 % for tiotropium Respimat® 5 µg, tiotropium Respimat® 2.5 µg, and placebo, respectively. The incidence of serious AEs and drug-related AEs was low in all treatment groups. No fatal adverse events were reported.

CONCLUSIONS: Once-daily tiotropium Respimat® add-on to at least medium-dose ICS±LABA provided significant and sustained improvements in lung function, improved asthma control, and reduced risk of asthma worsening in adults with moderate or severe symptomatic asthma.

		ACQ-7 responder rate, n (%)			
		Tiotropium Respimat® 5 µg QD	Tiotropium Respimat® 2.5 µg QD	Salmeterol HFA-MDI 50 µg BID	Placebo Respimat® QD ^a
PrimoTinA-asthma®	n	453	—	—	454
Week 24 ^b NCT00776984/NCT00772538	Response ^c	244 (53.9)	—	—	213 (46.9)
	No change	180 (39.7)	—	—	209 (46.0)
	Worsening ^d	29 (6.4)	—	—	32 (7.0)
	Odds ratio	1.32	—	—	—
	95 % CI	1.01, 1.73	—	—	—
PrimoTinA-asthma®	n	453	—	—	454
Week 48 ^b NCT00776984/NCT00772538	Response ^c	263 (58.1)	—	—	205 (45.2)
	No change	155 (34.2)	—	—	209 (46.0)
	Worsening ^d	35 (7.7)	—	—	40 (8.8)
	Odds ratio	1.68	—	—	—
	95 % CI	1.28, 2.21	—	—	—
MezzoTinA-asthma®	n	513	515	535	518
Week 24 NCT01172808/NCT01172821	Response ^c	330 (64.3)	332 (64.5)	356 (66.5)	299 (57.7)
	No change	162 (31.6)	163 (31.7)	156 (29.2)	181 (34.9)
	Worsening ^d	21 (4.1)	20 (3.9)	23 (4.3)	38 (7.3)
	Odds ratio	1.32	1.33	1.46	—
	95 % CI	1.02, 1.71	1.03, 1.72	1.13, 1.89	—

Full analysis set; all randomized patients who received at least one dose of trial medication with baseline data and at least one on-treatment efficacy measurement^aPlus placebo HFA-MDI BID in MezzoTinA-asthma®; ^bPost hoc analysis; ^c≥0.5 reduction in ACQ-7 mean score; ^d≥0.5 increase in ACQ-7 mean score
BID, twice-daily; HFA-MDI, hydrofluoroalkane metered-dose inhaler; QD, once-daily

TOWARD NATIONAL ESTIMATES OF INPATIENT QUALITY OF CARE AMONG HISPANICS: THE CASE OF ACUTE MYOCARDIAL INFARCTION MORTALITY RATES Meng-Yun Lin^{1, 4}; Nancy R. Kressin^{2, 3}; Michael Paasche-Orlow²; Lenny Lopez⁵; Jennifer E. Rosen⁶; Amresh D. Hanchate^{2, 3}. ¹Boston Medical Center, Boston, MA; ²Boston University School of Medicine, Boston, MA; ³Dept of Veterans Affairs and Boston University, West Roxbury, MA; ⁴Boston University School of Public Health, Boston, MA; ⁵Harvard University, Boston, MA; ⁶MedStar Washington Hospital Center, Washington, DC. (Tracking ID #2195780)

BACKGROUND: Although Hispanics now form the largest US minority, national estimates of disparities in quality of inpatient care have largely focused on the differences between blacks and whites, partly due to data limitations, including misclassification of Hispanics. We pooled inpatient discharge data from 15 states that together contain over 85 % of the national Hispanic population, and with near-complete identification of Hispanic ethnicity. Applying the Agency for Healthcare Research & Quality (AHRQ) Inpatient Quality Indicators (IQI) protocol, we compared risk-adjusted inpatient mortality from acute myocardial infarction (AMI) among Hispanics, non-Hispanic blacks, and non-Hispanic whites.

METHODS: Using comprehensive inpatient discharge data from Arizona, California, Colorado, Florida, Massachusetts, Maryland, New Jersey, New Mexico, Nevada, New York, Oregon, Pennsylvania, Texas, Virginia, and Washington, we identified AMI discharges for patients 18 and older in 2010–2011. Following AHRQ IQI protocol, we excluded discharges relating to

patients transferred between acute hospitals. Our primary estimate of interest was racial/ethnic differences in inpatient mortality rates (odds ratio [OR]) after adjusting for compositional differences in age, sex and comorbidities (Elixhauser indicators) using a logistic regression model with state-level fixed effects. To delineate confounding with socioeconomic status (SES) we further adjusted for county-level differences in zip-code household median income, poverty, uninsurance and provider availability. We estimated inpatient mortality differences among Hispanics by national origin (Mexican, Cuban, Puerto Rican and Other), using census data at county level. We also examined mortality disparities for ST-elevation and non-ST-elevation AMI (STEMI & NSTEMI). Statistical significance was assessed at 5 % level.

RESULTS: We identified 444,431 AMI discharges by patient race/ethnicity: Hispanics (12 %), blacks (9 %), whites (70 %), others (6 %) and missing (3 %). Observed inpatient mortality was 6.4 % with lower rates among Hispanics (6.1 %) and blacks (5.5 %). Adjusted for age, sex, comorbidities, and state, and compared to whites, inpatient mortality was higher among Hispanics (OR=1.11, 95 % confidence interval (CI) [1.07, 1.16]) and similar among blacks (OR=1.01, 95 % CI [0.96, 1.05]) (Table 1). This trend persisted after additional adjustment for income, poverty, uninsurance, and provider availability. The distribution of the Hispanic population by national origin was: Mexican (62 %), Puerto Rico (9 %), Cuban (4 %), and Others (25 %). Compared to Mexican Hispanics, adjusted mortality was higher among Cuban Hispanics (OR=1.25, 95 % CI [1.12, 1.40]) and similar among Puerto Rican and Other Hispanics. For STEMI cases, adjusted mortality was higher among blacks (OR=1.21, 95 % CI [1.12, 1.30]) and Hispanics (OR=1.08, 95 % CI [1.01, 1.15]), and for NSTEMI cases, adjusted mortality was higher

among Hispanics (OR=1.18, 95 % CI [1.11, 1.27]) and similar among blacks (OR=0.99, 95 % CI [0.93, 1.05]).

CONCLUSIONS: Nationally, Hispanics experienced worse inpatient mortality following AMI compared to whites and blacks, among both types of AMI, and after accounting for SES indicators. Further research is needed to extend comparisons to other indicators of hospital quality outcomes, and to explore the underlying factors. **Keywords:** disparity, race, ethnicity, quality, acute myocardial infarction, inpatient mortality

Table 1 Racial/Ethnic Differences in AMI Inpatient Mortality Rates

Race/Ethnicity (ref=NH white)	Unadjusted OR [95 % CI]	Model 1 OR [95 % CI]	Model 2 OR [95 % CI]
Hispanics	0.94 [0.90, 0.97]	1.11 [1.07, 1.16]	1.08 [1.02, 1.14]
Black, NH	0.85 [0.81, 0.88]	1.01 [0.96, 1.05]	1.00 [0.94, 1.05]

Notes: 1. Estimates for Asian & Others not reported. 2. Model 1 adjusted for sex, age, comorbidity, and state; Model 2 adjusted additionally for zip-code level median income, poverty, uninsurance, and provider availability.

TRANSITIONS OF CARE FROM OUTPATIENT TO INPATIENT: A SYSTEMATIC REVIEW [Phuong Luu](#)²; [Samantha I. Pitts](#)²; [Brent Petty](#)²; [Melinda Sawyer](#)¹; [Cheryl Himmelfarb-Dennison](#)¹; [Romsai T. Boonyasai](#)²; [Nisa Maruthur](#)². ¹Johns Hopkins University, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD. (Tracking ID #2193027)

BACKGROUND: Optimizing delivery of care at times of transition has been a prominent focus of healthcare reform. However, most transitions of care research has focused on the transition from the acute care setting back to the outpatient setting. The transition from outpatient to acute care setting is also important, but little is known about the outpatient to acute care transition. We conducted a systematic review of the evidence on transitions of care from the outpatient to acute care setting, focusing on provider-to-provider communication and its impact on quality of care.

METHODS: We searched the MEDLINE, CINAHL, Scopus, EMBASE, and Cochrane electronic databases for English-language articles describing direct communication between an outpatient clinician (e.g., primary care provider, outpatient specialist, pharmacist, nursing home provider) and an acute care clinician (e.g., emergency department provider, hospitalist, pharmacist) around patients presenting to the emergency room or admitted to the hospital. Key questions were to describe communication and its impact on outcomes (e.g., 30-day readmission). Search terms were generated from database subject headings and keyword terms. We conducted double, independent review of titles, abstracts, and full text articles. All citations included by ≥1 reviewer were advanced to abstract review. Conflicts on abstract and full text article inclusions were resolved by consensus. Included articles were abstracted using standardized forms. Search results were maintained via Refworks (ProQuest, Bethesda, MD).

RESULTS: Of 4009 citations, twenty articles evaluated communication around the outpatient to acute care transition. Most studies were cross-sectional (12) with others being cohort studies (4), randomized controlled trials (3) and a pre-post study (1). Studies were conducted in the US (11), Australia (6) and the UK (3). Most transitions studied were from the outpatient clinic to admission to the hospital (12); others were clinic to the ED (4) and nursing home to ED (4). Modes of communication used were telephone (8), referral letters (5), fax (5), and in-person (2). None discussed communication via email. Primary care providers/general practitioners comprised the majority of outpatient providers (16), with the remainder being nursing home providers (4) and pharmacists (3). The majority of acute care providers were ED physicians (8), then hospitalists (4), pharmacists (2), residents (1), and unknown (3). Only 35 % of studies (7/20) evaluated outcomes related to provider-to-provider communication: Thirty-day readmissions (3 studies) and utilization of laboratory testing and imaging (2 studies) were lower when outpatient to acute care setting communication occurred. Patient satisfaction (1 study) and provider satisfaction (2 studies) were higher when communication was successful. There were no significant differences in length of hospital stay (2 studies) or mortality (2 studies) associated with provider-to-provider communication.

CONCLUSIONS: The literature on provider-to-provider communication at the transition from the outpatient to acute care setting is sparse and heterogeneous. The current evidence does suggest that successful communication at this transition can improve outcomes. Further research is needed on how to optimize communication to facilitate seamless transfer of information at this stage of care transitions.

TRENDS IN HOSPITAL-OWNERSHIP OF PHYSICIAN PRACTICES AND THE EFFECT ON PROCESSES TO IMPROVE QUALITY [Tara F. Bishop](#)^{1, 1}; [Shortell Stephen](#)²; [Patricia Ramsay](#)²; [Kennon Copeland](#)³; [Lawrence P. Casalino](#)¹. ¹Weill Cornell Medical College, New York, NY; ²University of California, Berkeley, CA; ³NORC at the University of Chicago, Bethesda, MD. (Tracking ID #2194686)

BACKGROUND: Recent reports suggest a trend for physician practices to change ownership from physicians to hospitals. It is unclear how a change to hospital-ownership affects quality of patient care. Given that hospitals generally have greater resources than physician practices, increased hospital ownership of practices may improve quality of care. The objective of this study was to report the change in prevalence of hospital ownership of physician practices owned and the effect on the use of care management processes (CMPs) and health information technology (HIT).

METHODS: We performed cross-sectional and trend analyses of the three largest national surveys of physician practices in the U.S. The sample consisted of a nationally-representative sample of leaders in primary care and select specialty practices in the U.S. treating patients with asthma, congestive heart failure, diabetes, and depression. Large practices (>19 physicians) were surveyed in 2005/2006 and 2012/2013. Small practices (≤19 physicians) were surveyed in 2008/2009 and 2012/2013. The main outcomes were the percentage of practices owned by hospitals in 2005/2006, 2008/2009, and 2012/2013 and the changes in CMP and HIT indices among practices that were acquired by hospitals.

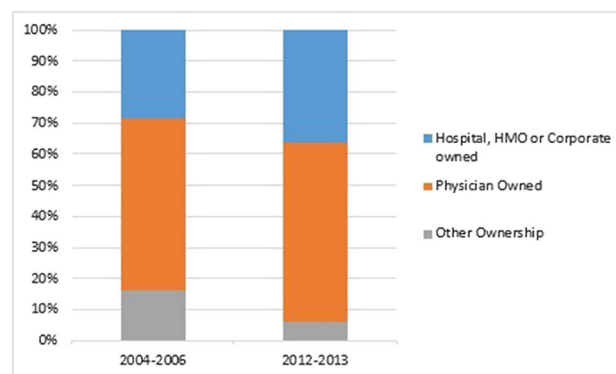
RESULTS: There was a non-significant increase in the percentage of large practices that were owned by hospitals in 2005/2006 (26.6 %) and 2012/2013 (35.6 %, $p=0.37$) and small/medium practices that were owned by hospitals in 2008/2009 (8.3 %) and 2012/2013 (11.3 %, $p=0.47$). Large practices acquired by hospitals had larger increases in their CMP index than those that remained physician owned (11.0 point increase vs. 7.0 point decrease, adjusted p -value=0.03). Small/medium practices acquired by hospitals had smaller but significantly higher increases in their CMP score (3.8 points vs. 2.6 points, adjusted $p=0.04$) compared with practices that remained physician-owned. Among all practices, there were no significant differences in the change in the HIT index between practices that were acquired by hospitals versus those that remained physician-owned.

CONCLUSIONS: This survey of physician groups showed minimal increase in the percentage of practices that were owned by hospitals, which is contrary to some previous surveys and anecdotal reports that physician groups are rapidly being acquired by hospitals. It may be that practices are considering changes in ownership but have not made that change or that reports of this change are over-stating what is actually occurring. As the healthcare environment continues to change and evolve due to changes in public and private policies, it will be important to continue to monitor both the prevalence and the effects of hospital ownership of practices on patients and physicians.

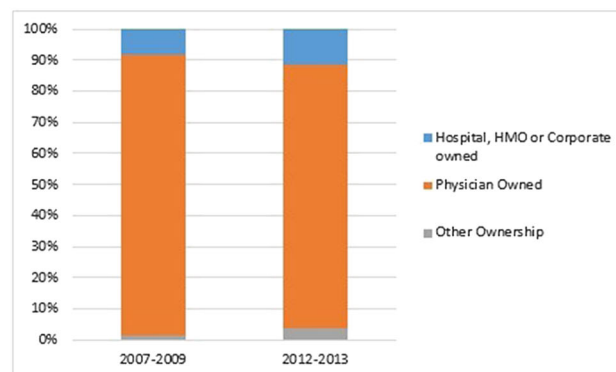
Figure. Percentage of practices owned by hospitals by year and size

Chart Area

Panel a. Large practices (20 or more physicians)



Panel b. Small practice (less than 20 physicians)



USE OF INTERNET AND TELEPHONE REFILLS AMONG LINGUISTICALLY DIVERSE PATIENTS WITH LIMITED-ENGLISH PROFICIENCY AND CHRONIC CONDITIONS Gerardo Moreno²; Elizabeth Lin¹; Eva Chang¹; Do Peterson¹; Ron Johnson¹; Heidi Berthoud¹; Leo Morales³. ¹Group Health Research Institute, Seattle, WA; ²UCLA, Los Angeles, CA; ³University of Washington, Seattle, WA. (Tracking ID #2196338)

BACKGROUND: The availability of patient internet sites with shared medical records (SMR) may provide an effective system level approach to help mitigate language-based disparities in medication non-adherence. The use of online prescription medication refill systems is relatively new in many healthcare systems and its application has been limited and targeted mostly to populations receiving care in vertically integrated health systems. Research shows that blacks and Latinos are less likely to use an online SMR system that has options to request medication refills, and that low education, income, and internet access are associated with lower use of online SMR. Despite emerging research on internet SMR, more research is needed on the use of online medication refill systems among non-English speaking patients and different ethnic groups with limited-English proficiency. The objective of this study was to describe the use of internet and telephone medication refill systems among an ethnically diverse sample of limited-English proficient (LEP) and English proficient (EP) patients with chronic conditions in a population of insured patients.

METHODS: We conducted a cross-sectional telephone survey in 6 languages/dialects (English, Cantonese, Mandarin, Korean, Vietnamese, and Spanish). The telephone survey was conducted between September and December 2013. Participants were 509 adults in ambulatory care in an integrated group practice healthcare delivery system. The study inclusion criteria included: (1) 18 years of age or older, (2) enrolled in the health systems health plan, (3) Diagnosis of one of the following three chronic conditions hypertension, hyperlipidemia, and/or diabetes, (4) had at least one medical visit (not urgent care or emergency room) within the health system during the last 6 months, and (5) spoke English, Cantonese, Mandarin, Korean, Vietnamese, or Spanish. Primary outcomes were use of 1) internet refill system, 2) telephone refill system, and 3) either internet or telephone refill system. The primary predictor was LEP as measured by the use of an interpreter. Other measures included race-ethnicity, age, gender, education, income, years in the U.S., and health status. We performed bivariate and multiple logistic regression analyses. In all regression models we adjusted for age, gender, education, and self-reported health status.

RESULTS: We found that among all survey participants, both EP and LEP ($n=509$), 38.4 % used the telephone and 31.4 % used the internet to refill medication. Patients that used a remote refill system were more educated, had higher incomes, and were younger compared to those didn't use a refill system. Among LEP patients ($n=328$), 21.2 % used the internet and 34.7 % used the telephone refill systems, compared to 50.8 and 37.6 % for English speaking patients ($n=181$). Half (49.5 %) of LEP patients used either the telephone or internet refill systems compared to 82.3 % for English speaking patients. LEP status was independently associated with not using the internet refill system (adjusted odds ratio [AOR]=0.30; 95 % Confidence Intervals [CI] 0.18, 0.49; $p < .001$) compared to English proficient patients. In adjusted analysis, LEP status was not significantly associated with use of the telephone refill system. The proportion of patients within each language group that used the internet refill system was: English (50.8 %), Cantonese/Mandarin (27.9 %), Vietnamese (24.7 %), Korean (17.4 %), and Spanish (12.0 %). The proportion of patients within each language group that used the telephone refill system was: English (37.6 %), Cantonese/Mandarin (19.5 %), Vietnamese (27.2 %), Korean (56.2 %), and Spanish (38.0 %).

CONCLUSIONS: In this study we found substantial variation in the use of remote medication refill systems among a linguistically diverse group of LEP adults with chronic conditions. We found that 50 % LEP patients do not use either internet or telephone remote medication refill systems compared to 20 % among EP patients. To reach all populations within a health system that may potentially benefit from this system level change, efforts will need to be made to open access to persons with limited English proficiency. The results may be of interest to health systems that serve a linguistically diverse patient population at high risk for medication non-adherence.

USING PHOTOVOICE TO PROMOTE DIABETES SELF-MANAGEMENT FOR LATINO ADULTS Arshiya A. Baig¹; Matthew Stutz⁴; Patricia Fernandez¹; Amanda Benitez²; Cara A. Locklin³; Yue Gao³; Sang Mee Lee¹; Michael T. Quinn¹; Marla C. Solomon²; Lisa Sanchez-Johnsen³; Deborah L. Bumet¹; Marshall Chin¹. ¹University of Chicago, Chicago, IL; ²University of Illinois, Chicago, IL; ³University of Illinois at Chicago, Chicago, IL; ⁴University of California, Los Angeles, Los Angeles, CA. (Tracking ID #2198802)

BACKGROUND: No studies have assessed the feasibility and acceptability of using photovoice to promote diabetes self-management. We assessed the themes that emerged

from a photovoice exercise that was part of a diabetes self-management program for Latino adults and measured patient satisfaction.

METHODS: Fifty adults with self-reported diabetes were enrolled in an 8-week church-based, culturally tailored intervention that consisted of weekly diabetes self-management classes led by lay leaders trained in motivational interviewing. Intervention participants were given disposable cameras and asked to take photographs of their lives with diabetes. In the weekly classes, participants discussed their photos with the group and shared their challenges and successes in diabetes self-care. The class leaders guided the group photo discussions and took notes on why the photo was important to the person who took it and what others in the class discussed regarding the photo. Using a codebook derived from prevalent themes, two researchers coded the photos and the discussion notes. Participants evaluated the photovoice activities at 6-month follow-up. The evaluation questions were analyzed using descriptive statistics.

RESULTS: Participants' mean age was 54 ± 12 years, 81 % were female, 98 % were Latino, 71 % only spoke Spanish at home, 82 % had a household income below \$30,000, and 51 % were uninsured. Of the 50 participants enrolled in the intervention, 37 attended at least one class, 26 participants took photos and 23 participants shared their photos in class. Participants' photos spurred group discussion around diabetes self-management. Participants gave advice, were empathetic, and motivated the participants who presented their photos to make or sustain healthy behaviors. For example, one participant showed the group a photo of a statue holding a pack of cigarettes. He stated the picture captured the moment he decided to quit smoking while at work. The group encouraged him to try to stop smoking and understood the challenges in trying to quit. Of all the photographs taken, 79 % were of family, friends, or social gatherings, 47 % were of nutrition and exercise, 39 % were of the local neighborhood, 33 % depicted diabetes medications and supplies, 25 % depicted the patient's home, and 8 % were of religious images. At 6-month follow-up, 86 % of participants who attended the intervention learned about better managing their diabetes from others' photos, 82 % said they gained more confidence in managing their diabetes from talking about the photos, 82 % noted the photo discussions helped them better manage their diabetes, and 93 % noted that sharing photos made them feel more connected to the people in the group.

CONCLUSIONS: In a diabetes self-management intervention for Latinos, participants were highly satisfied with the photovoice exercise and had high rates of participation. Photovoice provided an effective vehicle to receive and provide social support and promote behavior change. Future studies should consider using photovoice as a way to encourage healthy behavior change and facilitate social support in a group setting.

VALIDATION OF A BRIEF CLINICIAN SURVEY TO REDUCE CLINICIAN BURNOUT. Scott Shimotsu; Sara Poplau; Mark Linzer. Hennepin County Medical Center, Minneapolis, MN. (Tracking ID #2191173)

BACKGROUND: Clinician stress and burnout rates are high and rising in the US. We validated a brief (10 question) survey to determine areas for work life improvement within all clinical departments at an upper Midwestern safety net hospital. The survey was administered by a provider wellness committee charged with improving clinician wellness. A valid and reliable tool that captures the dimensions of clinician work life may be effective in improving the longevity of providers in health care systems. This paper evaluates the psychometric properties of the brief instrument.

METHODS: We developed a brief self-administered questionnaire that was distributed electronically via Survey Monkey to clinicians. The instrument was modified from prior work life measures of the MEMO study (Minimizing Error Maximizing Outcome), and is called the Mini Z (for Zero Burnout Program). It included 10 quantitative questions concerning stress, burnout and their predictors. The survey was sent to a total of 603 clinicians including dentists, psychologists, physicians and advanced practice providers (NPs and PAs). The survey used 5 point likert scales to query job satisfaction, stress, burnout, workload, time for documentation, work environment (chaotic, busy, calm), values alignment with leadership, teamwork, time spent at home using the electronic medical record (EMR), and EMR proficiency. Main global measures included satisfaction ($n=3$ items), stress and burnout ($n=4$ items) and EMR-related stress ($n=3$ items). Returned surveys ($n=402$) resulted in 366 usable responses, which were randomly separated into developmental ($n=178$) and cross validation samples ($n=178$). All analyses were conducted using PC SAS 9.2 (Cary, North Carolina). First, we conducted confirmatory factor analyses (CFA) to evaluate a priori global scales. Based on Nunnally's convention, we used the Kaiser's eigenvalue rule and scree plots to identify total number of factors. An oblique rotation was applied to the CFA. We computed Cronbach alpha coefficients to assess reliability of each global scale. Second, pearson correlations were used to evaluate convergent and discriminant validity. Further, we used latent class analyses to determine characteristics of satisfied and dissatisfied clinicians. The same analyses were performed on both the developmental and cross-validation samples.

RESULTS: Of the 603 providers, 402 (67 %) clicked on the survey and 366 (61 %) completed it. Factor analysis revealed two factors: 1) teamwork/values, and 2) EMR use and stress. Overall alpha for the 10 items was 0.80; individual factor alphas were 0.74 and 0.72 for the teamwork/values factor and EMR use/stress factors, respectively. Correlations demonstrated convergent validity across survey items, with modest to moderate r values (0.39–0.57, $p < 0.0001$) between burnout and most mini Z items (satisfaction, values, teamwork, stress, work control, chaos and documentation time). Latent class analysis confirmed two classes of clinicians: a high satisfaction group (with teamwork and aligned values), and a high stress group (with high burnout and low work control). All analyses were similar in the cross-validation sample.

CONCLUSIONS: Clinician burnout and work life can be feasibly and reliably captured using the Mini Z survey tool. Our a priori sub-scales were partly supported as we hypothesized a satisfaction factor as well as a stress factor. The brief instrument may allow health care systems to feasibly assess stress, burnout and satisfaction among clinician workforces. By addressing root causes of stress and burnout in clinicians, health care systems can better recruit and retain their talent. Future work includes validation of the instrument on a nationwide sample of clinicians.

VULNERABILITY FOR HEALTHCARE COMMUNICATION GAPS FOR USERS OF VA PURCHASED CARE: IMPLICATIONS FOR THE VETERANS CHOICE ACT Donna L. Washington^{1,2}; Alison B. Hamilton^{1,2}; Kristina M. Cordasco^{1,2}. ¹VA Greater Los Angeles Healthcare System, Los Angeles, CA; ²UCLA School of Medicine, Los Angeles, CA. (Tracking ID #2198688)

BACKGROUND: The recent Veterans Choice Act is designed to expand timely access to health care for Veterans Health Administration (VA) users through purchasing services from non-VA community providers. These care arrangements will potentially create coordination and communication gaps between patients' VA and non-VA providers, and between patients and their providers. Some Veteran populations may be particularly vulnerable for experiencing these communication gaps, increasing their risk for poor health outcomes. Our objective was to identify patient characteristics associated with communication gaps among Veterans using VA-purchased care delivered by non-VA providers.

METHODS: We conducted a secondary data analysis of the National Survey of Women Veterans (NSWV), a 2008–09 population-based telephone survey of women Veterans (response rate 86 %). Our analytic sample was comprised of 604 NSWV participants who used any VA-purchased non-VA provider care in the 12 months prior to the survey. Health care coordination and communication was measured with five questions that each assessed patient perceptions of communication (table). All measures used five-point Likert response options (all of the time; most of the time; some of the time; rarely; never). Responses of never, rarely, or some of the time were classified as indicative of a communication gap. We assessed prevalences of having any communication gap, and gaps by measure, followed by chi square and logistic regression analyses for the association of patient characteristics with each of the five measures. All analyses applied weights to account for the study design and response rate.

RESULTS: Nearly half (46 %) of the respondents perceived a communication gap in one or more of the measures. In unadjusted analyses, characteristics associated with a greater likelihood of a perceived communication gap were age 18–44 years (65 %), being a college graduate (54 %), being a newer Veteran (military service during the first Gulf War, the following peacetime, or during Operations Enduring Freedom/Iraqi Freedom/New Dawn [OEF/OIF/OND]) (59 %), having a military service-connected disability (53 %), and screening positive for a mood disorder (depression, anxiety, or post-traumatic stress disorder) (54 %). The table shows prevalence of communication gaps by measure. For each measure, age 18–44 years (versus older) was associated with a greater likelihood of experiencing a communication gap. In each of the first four measures, newer Veterans were more likely than those who served in the post-Vietnam Era or earlier to experience a communication gap. For example, a communication gap was perceived for these measures by 28 %, 42 %, 40 %, and 28 %, respectively, of OEF/OIF/OND Veterans. Being a college graduate was associated with perceived communication gaps for measures 1 (26 %), 3 (29 %), and 5 (27 %). Employed Veterans, Veterans with a military service-connected disability, and those screening positive for a mood disorder were more likely than others to report a gap in being able to get a convenient appointment (all 26 %). Communication gaps did not appear to vary by respondents' race/ethnicity, income, insurance, or having three or more diagnosed medical conditions. In adjusted analysis, only younger age remained independently associated with having a perceived communication gap in one or more of the measures.

CONCLUSIONS: A sizable proportion of women Veterans using VA purchased care reported communication gaps in their care. Several patient characteristics identified Veterans at increased risk. The finding that younger Veterans are more likely to experience communication gaps is especially salient given that this is a growing demographic within VA-users. VA has recently implemented a new infrastructure to coordinate purchased care,

though its effect on patient experiences of care is unknown. As the national Veterans Choice Act is implemented, expanding use of VA-purchased non-VA provider care, the VA should continue to make efforts to ensure that care provided from multiple sources is coordinated and that communication between VA and non-VA providers is seamless.

Care Coordination and Communication Measures: Percent Reporting a Communication Gap (response: some of the time, rarely, or never)

1. How often do your medical providers at the VA know about test results or tests you have had at a contract facility?	1 9 %
2. How often do you know how to get the results of your tests or medical procedures that were done at a VA contract facility?	2 0 %
3. How often does there seem to be good communication about your healthcare between your providers at the VA and providers at the contract facility?	2 3 %
4. When you have problems with your health, how often do you know who to call among your VA and non-VA medical providers?	1 4 %
5. How often can you get an appointment at a time that is convenient for you for contract services?	2 1 %

WHAT CAN HOSPITALISTS TEACH THE TEACHING SERVICE? COMPARING PATIENT EXPERIENCES ON HOSPITALIST AND HOUSESTAFF SERVICES Charlie M. Wray¹; Micah Prochaska¹; David Meltzer²; Vineet M. Arora². ¹University of Chicago, Chicago, IL; ²University of Chicago Medical Center, Chicago, IL. (Tracking ID #2196296)

BACKGROUND: It is recommended that hospitalized patients understand and know who is in charge of their care. Yet the complex system of physician teams in academic teaching hospitals may interfere with current recommendations that patients know and understand who is responsible for their care at all times. Given the inherent differences between housestaff and hospitalist services, we aimed to compare patient's ability to identify and understand the roles of their physician(s) between these two services.

METHODS: We performed a retrospective cohort analysis using data from internal medicine teaching and non-teaching services from July 2007 to June 2013 at an academic medical center. Patients were allocated first to teaching services staffed by an attending, resident, and two interns until the team capped, and subsequently to the hospitalist service which includes a nurse practitioner. Self-reported responses to a 30-day follow-up questionnaire were used to assess patients' ability to 1) identify their physician(s) 2) understand the role of their physician(s) 3) rate the coordination of care, and 4) overall care. Responses were dichotomized to reflect the top 2 categories ("Excellent & Very Good") and chi-square analyses were used to assess any differences. A multivariate logistic regression which controlled for baseline differences in patient characteristics (age, gender, length of stay, Charlson Comorbidity Index, academic year, and prior hospitalizations) was performed to ascertain the association between service type and patient-reported outcomes.

RESULTS: Data from 5753 housestaff and 2252 hospitalist service patients demonstrated that those on the hospitalist service were more likely to report being able to identify their physician (49 % vs. 45 % $p < 0.05$), understand the role of their physician (55 % vs. 50 %, $p < 0.05$), report greater satisfaction with coordination and teamwork (68 vs. 65 %, $p < 0.05$), and with overall care (72 % vs. 67 %, $p < 0.05$). In multivariate logistic regression, patients on the hospitalist service were 13 % more likely to report being able to understand the role of their physician (OR 1.13; 95 % CI, 1.01–1.27) and rated their overall care higher (OR 1.15; 95 % CI, 1.02–1.30) than patients on the teaching service.

CONCLUSIONS: Compared with housestaff services, patients under the care of a hospitalist service report being better able to understand the role of their physician and rated their overall care better. These findings may reflect inherent structural differences between the two services such as fewer providers or process differences such as greater attention to team introductions. Understanding these mechanisms may provide insight into how best to enhance the patient experience on both teaching and hospitalist services in academic medical centers.

WHO WANTS TO KNOW? DESIRE FOR PREDICTIVE TESTING FOR ALZHEIMER'S DISEASE AND IMPACT ON ADVANCE CARE PLANNING Meera Sheffrin; Irena Stijacic Cenzer; Michael A. Steinman. UCSF/ San Francisco VA Medical Center, San Francisco, CA. (Tracking ID #2171144)

BACKGROUND: Currently, much research is devoted to developing a test that would predict future Alzheimer's disease. However, it is unknown who in the United States would want such as test, and how it would change subsequent behavior. Using a large national sample, we explored who would take a free and definitive test predictive of Alzheimer's disease, and examined how use of such a test may impact advance care planning.

METHODS: In this cross-sectional study, we identified 874 adults age 65 or older in the Health and Retirement Study in 2012 who were asked the question: "If you could receive a test from your doctor, free of charge, that would definitely determine whether or not you would develop Alzheimer's disease sometime in the future would you want to be tested?" Subjects were then told to imagine they knew they would develop Alzheimer's disease in the future, and with this knowledge to rate the chance of completing advance care planning activities on a scale of 0–100. We classified >50 as being likely to complete that activity. We evaluated characteristics associated with willingness to take a test for Alzheimer's disease, and how such a test would impact completing an advanced directive and discussing health plans with loved ones.

RESULTS: Among the 874 individuals, 861 (99 %) answered the question. Mean age was 74 years and 56 % were female. Overall, 75 % ($N=648$) would take a free and definitive test predictive of Alzheimer's disease. Older adults willing to take the test had similar race and educational levels as those that would not, but were more likely to be ≤ 75 years old (63 % vs 52 %, $p<0.01$). There were no differences in willingness to take the test by level of self-perceived health or memory problems, self-perceived risk of Alzheimer's disease, or number of comorbidities. After subjects were asked to assume they knew they would develop Alzheimer's disease, 87 % reported they would be likely to discuss health plans with loved ones. Most (81 %) reported they would be likely to complete an advanced directive, though only 15 % reported having done so already.

CONCLUSIONS: In this nationally representative sample, 75 % of older adults would take a free and definitive test predictive of future Alzheimer's disease. Many expressed intent to increase activities of advance care planning with this knowledge. The potential for high demand, widespread use, and the opportunity to engage patients in advance care planning should be considered as tests predictive of Alzheimer's disease become available.

AN EVALUATION OF DRUG-ALLERGY INTERACTION ALERT OVERRIDES IN INPATIENTS Sarah P. Slight^{1,3}; Patrick E. Beeler¹; Diane L. Seger⁴; Olivia Dalleur¹; Mary Amato²; Tewodros Eguale¹; Karen C. Nanji¹; Patricia C. Dykes¹; Michael Swerdlow⁶; Julie Fiskio⁴; David W. Bates¹. ¹Brigham and Women's Hospital, Boston, MA; ²Brigham and Women's Hospital/MCPHS, Boston, MA; ³Durham University, Stockton on Tees, United Kingdom; ⁴Partners Healthcare System, Wellesley, MA; ⁵Partners Healthcare Systems Inc., Wellesley, MA. (Tracking ID #2198426)

BACKGROUND: Clinical Decision Support (CDS) systems are designed to provide real-time guidance and support to providers at the point of prescribing. Drug allergy interaction alerts (DAIs) are generated when a known adverse sensitivity inducing substance is prescribed. High DAI override rates have been reported in the outpatient setting.⁽¹⁾ We evaluated the DAI override rates in the inpatient setting and the reasons why providers chose to override these alerts.

METHODS: After obtaining IRB approval, all Level 2 DAI alerts from Jan 2009 to Dec 2011 were obtained from the Brigham and Women's Hospital, Boston, MA. A total of 2783 prescribers received allergy alerts at this site. Level 2 alerts suggest an undesirable interaction likely to cause serious injury, and give the provider the option of 'cancelling' the order or 'overriding' the alert. The downloaded file included the coded reasons given by physicians at the time of overriding the alert.

RESULTS: Overall 83.9 % (110,414 / 131,615) of the DAI alerts generated were overridden. Drug classes, which were more frequently associated with allergies, triggered 31,843 DAI alerts (24.2 %) and were broken down as follows: cephalosporins (13.7 %, $n=17,978$), aspirin and NSAIDs (6.6 %, $n=8,730$), penicillins (1.8 %, $n=2,379$), sulfonamides (1.4 %, $n=1,819$), ACE inhibitors and angiotensin receptor blockers (0.55 %, $n=724$), contrast media (0.12 %, $n=161$), and monoclonal antibodies (0.04 %, $n=52$). Opioids triggered more than half of the alerts (50.9 %, $n=66,949$), although these drugs are usually associated with sensitivities rather than true allergies. Providers overrode 72.5 % (1721/2373) of alerts that indicated that the patient was at risk of developing anaphylaxis, and were more likely to override these alerts when prescribing penicillin (62.5 %, 50/80) than contrast media (15.4 %, 2/13). The most common coded reasons for overriding DAI alerts were 'Patient has taken previously without allergic reaction/patient has tolerated previously' (56.0 %, 61,858/110,414), 'Physician aware' (16.8 %, $n=18,583$) and 'Low risk cross sensitivity, will monitor' (12.0 %, $n=13,202$).

CONCLUSIONS: This study offers important insights into providers' behavior and the specific DAI alerts that were commonly overridden. The override rate of DAI alerts in inpatients was found to be very high. The inclusion of inaccurate or incomplete allergy information in the patient's electronic health record can lead to the production of clinically inappropriate alerts. Suppressing

alerts that have been previously overridden for an individual patient may help to reduce the numbers of inappropriate DAI alerts. Further research is needed to ascertain how best to record drug-allergy information and present the user with useful drug-allergy alerts. **References:** Nanji KC, Slight SP, Seger DL, Cho I, Fiskio JM, Redden LM, et al. Overrides of medication-related clinical decision support alerts in outpatients. *J Am Med Inform Assoc.* 2014;21(3):487–91.

CAN'T WE JUST HAVE SOME SAZ6N? EVALUATION OF A NEW SCHOOL FOOD PROGRAM IN DORCHESTER, MA Avik Chatterjee²; Genevieve Daftary³; Meg Campbell⁴; Lenward Gatison⁴; Liam Day⁴; Kibret Ramsey²; Roberta E. Goldman⁵; Matthew W. Gillman¹. ¹HMS-HPHCI, Boston, MA; ²Harvard Pilgrim Health Care Institute/Department of Population Medicine at Harvard Medical School, Cambridge, MA; ³Codman Square Health Center, Boston, MA; ⁴Codman Academy Charter Public School, Boston, MA; ⁵Warren Alpert Medical School, Brown University, Providence, RI. (Tracking ID #2192631)

BACKGROUND: Child and adolescent obesity is a growing problem in the United States and leads to obesity and chronic disease in adulthood. Certain dietary patterns, such as eating fruits, vegetables and whole grains and avoiding red meat, are linked to healthier weight and lower incidence of chronic disease. With 31 million children receiving food through the National School Lunch Program, schools provide a unique opportunity to promote healthy eating in children. In September 2013, a Dorchester high school in a low-income neighborhood launched a pilot nutrition program, with school food meeting new 2013 United States Department of Agriculture (USDA) requirements. The program included additional nutrition education and a junk food free policy. Our objective was to understand the attitudes of students, parents and staff to the new school food program that aimed to improve eating behaviors.

METHODS: Investigators employed community-based participatory research methods to complete a qualitative evaluation of the new food program at the school. School staff, student and community investigators from a neighboring health center were full partners in study design, implementation, and analysis. The study site was a public charter high school in the Dorchester neighborhood of Boston, MA, with approximately 140 students, where 98 % of students are people of color and 86 % qualify for free or reduced lunch. All students, parents, and faculty/staff were eligible, but due to resource constraints, we excluded parents who could not speak English. We conducted 4 student focus groups (1 per grades 9–12, $n=32$ participants), 2 parent focus groups ($n=10$), 1 faculty/staff focus group ($n=14$), and interviews with school leadership ($n=3$). We used the immersion/crystallization technique to find themes from transcripts of recordings of focus groups and interviews.

RESULTS: Ten themes emerged from the focus groups and interviews, in three major categories—impressions of the food itself (insufficient portion size, dislike of the taste, appreciation of the freshness, and overall dissatisfaction leading to fast food consumption outside of school), impact on student learning (students now knowing what's healthy, pride in the innovative nature of the program, the tension between external control vs. freedom to choose), and concerns about stakeholder engagement (need for more student and family engagement, and a lack of cultural appropriateness of the food). A representative statement from a parent was: "You need something to hold them from 9 to 5, because if they are hungry, McDonald's is right there" (Table 1).

CONCLUSIONS: Students, parents, and school staff appreciated the educational value of the new school food program based on USDA guidelines, but dissatisfaction with taste, portion size, student/family engagement, cultural appropriateness and unhealthy eating behaviors outside of school pose important challenges. School leadership were particularly sensitive to the fact that overall dissatisfaction with the new school food program may paradoxically be leading to increased consumption of unhealthy foods, such as fast food, outside of school. School leadership is committed to changing the school food program in order to improve student satisfaction with school food, while continuing to adhere to USDA guidelines. Near-term action steps could include creating a sodium-free seasoning bar for students, educating students and families about the new USDA guidelines and working with families to incorporate culturally appropriate recipes to the school's menu. Longer-term changes include finding resources to add an additional meal at the end of the school day, and working with local restaurants to promote healthy offerings for young people—a strategy that has been employed in another nearby community with success. Changing eating behaviors in children and adolescents will be vitally important to prevent obesity and chronic disease in adults. New USDA guidelines and other school-based solutions are important tools, but our study reveals some important challenges for schools that adopt the new guidelines. Schools and communities will need to address such challenges in order for school-based healthy eating interventions to be successful.

Table 1: Sample quotations from student, parent, and school staff focus group participants about a new school food program at a Dorchester, MA, high school

	Theme	Quote
Category 1: The Food Itself	Taste	"Can't we just have some sazón?"
	Portion size	"When I leave here, I leave hungry."
	Undesirable eating behaviors	"You need something to hold them from 9 to 5, because if they are hungry, McDonald's is right there."
Category 2: Student Learning	Freshness	"Healthy food is fresh food."
	Impact on student education	"Our students [now] know what is healthy and what isn't healthy."
	Control vs. choice	"At the end of the day, you can't really force anyone to eat [healthy foods]"
Category 3: Stakeholder Engagement	Innovation	"[The new school food program] helped me to think critically...kudos to the school."
	Student engagement	"I loved Saturday cooking class. I want to do more."
	Family engagement	"There's school breakfast?"
	Cultural representation	"All the vegetables together with meat, [we Haitians] call it 'legume,' and she loves that. That is a good food for them."

IT'S SO COMPLICATED: A NEEDS ASSESSMENT TO INFORM CONTINUING MEDICAL EDUCATION FOR PRIMARY CARE PROVIDERS ON PROSTATE CANCER AND AFRICAN AMERICAN MEN Nynikka R. Palmer¹; Justin Morgan²; Michael B. Potter¹; Eunice Neeley³; Matthew R. Cooperberg¹; June M. Chan^{1, 1}; Peter R. Carroll¹; Rena Pasick^{1, 1}. ¹University of California San Francisco, San Francisco, CA; ²John Hale Medical Society and John Hale Foundation, San Francisco, CA; ³Kaiser Permanente, Oakland, CA. (Tracking ID #2198141)

BACKGROUND: Advances in medical science can exacerbate existing disparities in prostate cancer (PCa) care if they are only adopted in settings that serve those who are affluent, insured, and/or highly educated. African American patients, bearing the greatest burden of PCa, are overrepresented in safety net settings, and the gap between best and actual practice in PCa care is wider for African American men than for other low-income patients. Primary care providers (PCPs) can play an important role across the PCa spectrum. While urologists are typically the first clinicians to discuss treatment options with newly diagnosed patients, screening and evaluation of symptoms usually takes place in primary care. PCPs often have established relationships with patients and are at times involved in PCa treatment decision-making. PCPs are also being called upon to assume more responsibility for cancer survivors' post-treatment follow-up. One step toward reduction of African American PCa disparities could be better integration of PCPs in the PCa management team. However, awareness and adoption of the most advanced treatment usually requires intensive promotion and education. We sought to explore the gaps between actual and optimal practice, and to elucidate the needs, preferences, and priorities around PCa care among PCPs who serve the African American community. These data were collected to inform the development of a continuing medical education (CME) curriculum for PCPs on state-of-the-science PCa care for African American men.

METHODS: We conducted a qualitative study which included three focus groups to explore the perceptions and practices regarding PCa care among clinicians serving African American men. Both PCPs and urologists from a range of settings were invited to participate through a partnership between the UCSF Clinical and Translational Science Institute's Clinical Research Network and the John Hale Medical Society. Each group included 6–9 participants, lasted approximately 90 min, and was led by PCP research team members (Drs. Morgan and Potter). Clinicians received a \$100 incentive payment for their time and participation. Focus groups were audio recorded, transcribed verbatim, and analyzed by two researchers (Drs. Palmer and Pasick) using thematic content analysis.

RESULTS: Twenty-three health care providers participated in focus groups in November 2012 (n=8), January 2013 (n=9), and February 2013 (n=6). The majority were PCPs (n=21), 12 were female, and there was one nurse practitioner and one urologist. Providers were Caucasian (n=13), African American (n=8), Latino (n=1) and Asian (n=1). Three main topics were discussed: PCa screening and shared decision-making, PCP's involvement in PCa care, and ideal components of a CME curriculum. *PCa Screening and Shared Decision-Making:* PCPs consistently expressed uncertainty about best screening practices in light of current controversies and shifting guidelines regarding efficacy of the prostate-

specific antigen test and the lack of data specific to those at high risk, particularly African Americans. PCa screening practices varied by provider and certain patient characteristics (e.g., high risk, requested test, or symptomatic). PCPs clearly recognized the importance of discussing the risks and benefits of PCa screening and engaging patients in shared decision-making, but admitted that this conversation is complicated and severely limited by time constraints. *PCP's Involvement in PCa care:* PCPs expressed the desire to participate in the treatment decision-making process; several noted that patients have sought their input and they want to remain part of the process. However, providers felt they lacked sufficient knowledge about PCa care, treatment options, side effects, and post-treatment care, to help their patients understand their options and receive the best care. Providers also mentioned the need for better communication between PCPs and urologists. *Developing A CME Curriculum:* Providers were amenable to attending a CME on PCa care, noting key topics: synthesis of the controversy in PCa screening and clarification of guidelines, treatment options, side effects, and any differences specific to African American men. They discussed the need to include both PCPs and urologists as presenters and participants. Providers preferred in-person CME that was interactive and focused on communication skill-building for a brief yet effective discussion with patients.

CONCLUSIONS: Many PCPs desire to play a more integral role in caring for their patients facing PCa. However, they are uncertain about best practices across the PCa continuum. Providers are amenable to a CME course addressing state-of-the-science PCa care from screening through survivorship.

WALKING IN FAITH: EXAMINING THE FEASIBILITY OF IMPLEMENTING A FAITH-BASED NUTRITION EDUCATION AND WALKING PROGRAM. Milele L. Bynum¹; Giselle M. Corbie-Smith². ¹University of North Carolina, Durham, NC; ²University of North Carolina, Chapel Hill, NC. (Tracking ID #2198779)

BACKGROUND: African Americans continue to be disproportionately affected by obesity and obesity-related health problems. Innovative methods that tap into the strengths and resources of the African American community are needed. The purpose of this study was to describe the feasibility of using a community-based participatory research (CBPR) approach to implement the Faithful Families: Eating Smart and Moving More curriculum coupled with a walking program in an African American church. The primary objectives of the study were to equip lay leaders to serve as program co-facilitators, increase physical activity, and improve knowledge and skills related to nutrition and healthy eating behaviors.

METHODS: Working with the partnering church, a 10-week nutrition education and walking program was piloted. Church lay leaders were trained to facilitate the Faithful Families curriculum. At baseline and 10-weeks, we collected quantitative outcome data on physical activity; fruit/vegetable intake; changes in blood pressure [BP], and weight) and post intervention process data through semi-structured interviews with participants and facilitators to assess acceptability, implementation fidelity, and limited efficacy testing.

RESULTS: Eight lay leaders were recruited and completed a two-day training. By the conclusion of the program, seven lay leaders each co-facilitated at least four nutrition education sessions, attended at least one walking session weekly and assisted with the collection of data from participants. Thirty-five church members attended an orientation session to hear about the program, with 31 consenting to participate in the study. Twenty-two of them completed the study and provided follow-up data. At baseline, the mean fruit and vegetable intake was 3.56 servings/day. Participants averaged 121.88 min/week of physical activity, with 23.81 % of the participants meeting physical activity recommendations of at least 150 min/week. At 10 weeks, participants realized a statistically insignificant reduction in BMI from 30.72 to 30.68; systolic and diastolic blood pressure decreased by 8.31 and 6.05 points respectively; mean fruit and vegetable intake increased by 0.58 servings/day to 4.14 servings/day; and physical activity mean improved by 50.82 min/week to 172.70 min/week with 61.90 % of the participants meeting physical activity recommendations of 150 min/week. Participants and facilitators endorsed the content and structure of the intervention as acceptable. Participants expressed satisfaction with the program, stating that it helped them to change habits, exercise more, and become conscious of what they were eating and drinking. However, they did voice a desire to have more support through accountability partners, more information on physical activity and an expanded faith component.

CONCLUSIONS: This study demonstrated that it is feasible to use a CBPR approach to implement a faith-based nutrition education and physical activity program using trained lay leaders recruited from the partnering church. By utilizing individuals from within the church to develop and implement the program, *Walking in Faith* was able to engage members of the faith community, while promoting improved health outcomes and program sustainability.

¹⁸F-FDG PET OR PET/CT AND ⁶⁷Ga-CITRATE SCINTIGRAPHY IN THE DIAGNOSIS OF CLASSIC FEVER OF UNKNOWN ORIGIN: A SYSTEMATIC REVIEW AND META-ANALYSIS OF TEST PERFORMANCE AND DIAGNOSTIC YIELD Motoki Takeuchi¹; Takashi Nishashi²; Issa Dahabreh³; Teruhiko Terasawa¹. ¹Fujita Health University, Nagoya, Japan; ²Nagoya University Graduate School of Medicine, Nagoya, Japan; ³Brown University, Providence, RI. (Tracking ID #2189730)

BACKGROUND: Fever of unknown origin (FUO) is a common clinical dilemma encountered in general medical practice. Although advances in anatomical imaging tests such as ultrasound, contrast-enhanced CT (CECT), and MRI, and improved culture techniques have continuously modified the spectrum of FUO-causing diseases, identifying the cause of FUO still remains a challenge. ¹⁸F-FDG PET or PET/CT (FDG-PET or -PET/CT) and ⁶⁷Ga-citrate scintigraphy (Ga-scintigraphy) are expensive but established functional imaging tests in the clinical management of malignant diseases, and are promising imaging modalities that may assist detecting the cause of FUO when conventional modalities are not helpful. Although several studies on the use of these functional imaging tests for diagnosing FUO have been published, their clinical role and impact remain unclear. We therefore performed systematic review and meta-analysis to quantitatively synthesize the current evidence. In this presentation, we focus on their test performance (i.e., sensitivity and specificity), and impact on diagnosis (i.e., diagnostic yield: how often these functional imaging tests can contribute to diagnosis) and diagnostic or therapeutic management.

METHODS: We searched PubMed and Scopus (from inception until June 30, 2014) and no language restrictions were applied. We included studies of FDG-PET or -PET/CT, or Ga-scintigraphy that were performed for evaluating the cause of FUO in adult patients with classic FUO. Two independent reviewers screened abstracts, perused full-text publications for eligibility, and performed data extraction. Sensitivity and specificity were calculated from a 2 by 2 contingency table data according to whether patients were a functional imaging test positive or negative, and whether the cause of FUO was identified by any add-on tests performed after the imaging test and/or clinical follow-up as the reference standard. Study validity was assessed using the QUADAS-2. Meta-analysis was performed when 4 or more studies were available for each imaging test.

RESULTS: Of 4458 citations retrieved, 74 were selected for full-text review, 30 of which (11 for FDG-PET; 15 for FDG-PET/CT; 6 for Ga-scintigraphy) including 1436 patients with classic FUO were eligible. Only two studies assessed both Ga-scintigraphy and FDG-PET or FDG-PET/CT to compare these modalities. Most (23 studies, 77 %) had a retrospective design based on data derived from clinical practice, and reported non-uniform work-up strategies before undertaking functional imaging tests. Few adopted standardized work-up algorithms for classic FUO including CECT of the chest and abdomen in all patients. More invasive and accurate tests such as biopsy or surgery were preferentially performed as add-on tests for patients with a positive scan result, while clinical follow-up was typically performed for those with a negative result, suggesting a possibility of differential verification bias. Also, treating physicians often employed functional imaging test results as the reference standard to make a clinical diagnosis when the uptake pattern was suggestive of a non-infectious inflammatory disease (NIID) such as large vessel vasculitis, which could overestimate both test performance and diagnostic yield. Overall, a cause of FUO was identified in approximately two-thirds of patients. The summary sensitivity and specificity were respectively 0.84 (95 % confidence interval [CI], 0.78–0.89) and 0.64 (CI, 0.44–0.79) for FDG-PET/CT; 0.76 (CI, 0.65–0.84) and 0.60 (CI, 0.39–0.77) for FDG-PET; and 0.60 (CI, 0.45–0.73) and 0.63 (CI, 0.37–0.84) for Ga-scintigraphy. The summary diagnostic yield was 56 % (CI, 49 %–65 %) for FDG-PET / CT, 47 % (CI, 34 %–64 %) for FDG-PET, and 35 % (CI, 23 %–53 %) for Ga-scintigraphy. Only 3 studies reported how often the scan results altered diagnostic or therapeutic management, which precluded in-depth analysis. Comparative evidence regarding FDG-PET or -PET/CT versus Ga-scintigraphy was limited.

CONCLUSIONS: FDG-PET, FDG-PET /CT and Ga-scintigraphy can contribute to identifying the cause of classic FUO. However, their clinical role particularly in contrast to alternative imaging modalities in contemporary diagnostic pathways is uncertain and the calculated naïve test performance based on the imperfect reference standards may be overestimated. Regarding FDG-PET and FDG-PET/CT, despite their moderately high sensitivity, management decisions based solely on the scan results may lead to unnecessary interventions given the low specificity. Prospective studies in settings where work-up algorithms are standardized are needed to better clarify the clinical role and impact of these functional imaging tests in contemporary diagnostic strategies.

24-HOUR EFFICACY OF TIOTROPIUM RESPIMAT® IN ASTHMA Thomas B. Casale¹; David M. Halpin²; Michael Engel³; Petra Moroni-Zentgraf²; Achim Muller⁴; Kai-Michael Beeh⁵. ¹University of South Florida, Tampa, FL; ²Royal Devon & Exeter Hospital, Exeter, United Kingdom; ³Boehringer Ingelheim Pharma GmbH & Co. KG,

Ingelheim am Rhein, Germany; ⁴Boehringer Ingelheim Pharma GmbH & Co. KG, Biberach an der Riss, Germany; ⁵insaf Respiratory Research Institute GmbH, Wiesbaden, Germany. (Tracking ID #2194778)

BACKGROUND: The once-daily long-acting anticholinergic bronchodilator tiotropium Respimat® has demonstrated efficacy as add-on to at least inhaled corticosteroid (ICS) maintenance therapy across severities of symptomatic asthma. We assessed the efficacy of tiotropium Respimat® add-on therapy over 24 h in adult patients with moderate or severe symptomatic asthma.

METHODS: Four Phase III, randomized, double-blind, placebo-controlled, parallel-group trials. PrimoTinA-asthma® (NCT00772538/NCT00776984): once-daily (morning dosing) tiotropium Respimat® 5 µg or placebo Respimat® add-on to high-dose ICS (≥800 µg budesonide or equivalent) plus a long-acting β₂-agonist in adults over 48 weeks; MezzoTinA-asthma® (NCT01172808/NCT01172821): once-daily (evening dosing) tiotropium Respimat® 5 µg or 2.5 µg, twice-daily (morning and evening dosing) salmeterol hydrofluoroalkane metered-dose inhaler 50 µg, or placebo (identical devices in a double-dummy protocol) add-on to medium-dose ICS (400–800 µg budesonide or equivalent) in adults over 24 weeks. We report 24-h lung function measurements, performed in a subset of patients.

RESULTS: Patients included in the 24-h full analysis set: PrimoTinA-asthma®, n=349 (tiotropium Respimat® 5 µg, n=172; placebo Respimat®, n=177); MezzoTinA-asthma®, n=583 (tiotropium Respimat® 5 µg, n=141; tiotropium Respimat® 2.5 µg, n=144; salmeterol, n=150; placebo, n=148). Tiotropium Respimat® significantly improved lung function over 24 h, compared with placebo, after 24 weeks, with significant improvements observed in peak forced expiratory volume in 1 s (FEV₁) within 0–3 h, trough FEV₁, and all measures (0–12, 12–24, and 0–24 h) of FEV₁ area under the curve with the 5 µg dose in PrimoTinA-asthma® and both the 5 µg and 2.5 µg doses in MezzoTinA-asthma® (Table).

CONCLUSIONS: Once-daily tiotropium Respimat® add-on to at least ICS maintenance therapy improves lung function and provides sustained bronchodilation over 24 h in adults with moderate or severe symptomatic asthma.

Tiotropium Respimat® versus placebo, mL Adjusted mean difference^a (95 % CI) p value

	PrimoTinA- asthma® ^b Tiotropium Respimat® 5 µg QD n=161	MezzoTinA- asthma® ^c Tiotropium Respimat® 5 µg QD n=140	Tiotropium Respimat® 2.5 µg QD n=144
Peak FEV ₁ (0-3h)	137 (58, 216) <0.001	150 (81, 219) <0.001	199 (130, 268) <0.001
Trough FEV ₁	108 (37, 180) 0.003 n=161	119 (46, 192) 0.001 n=140	159 (87, 232) <0.001 n=144
FEV ₁ AUC _(0-12h)	152 (69, 235) <0.001 n=159	151 (76, 226) <0.001 n=140	200 (126, 275) <0.001 n=144
FEV ₁ AUC _(12-24h)	138 (58, 217) <0.001 n=159	144 (67, 221) <0.001 n=140	203 (126, 279) <0.001 n=144
FEV ₁ AUC _(0-24h)	145 (65, 225) <0.001 n=159	147 (73, 222) <0.001 n=140	202 (128, 276) <0.001 n=144

Full analysis set with 24-h lung function test measurements

^aAdjusted for treatment, center, visit, visit-by-treatment, baseline, and baseline-by-visit;

^bPooled data; Week 24; add-on to high-dose ICS plus a long-acting β₂-agonist; ^cPooled data; Week 24; add-on to medium-dose ICS

AUC, area under the curve; CI, confidence interval; QD, once-daily; SE, standard error

30-DAY POTENTIALLY AVOIDABLE READMISSIONS DUE TO ADVERSE DRUG EVENTS IN MEDICAL PATIENTS Olivia Dalleur^{1, 4}; Patrick E. Beeler^{1, 3}; Jeffrey L. Schnipper¹; Jacques Donze^{2, 1}. ¹Brigham and Women, Boston, MA; ²Bern University Hospital, Bern, Switzerland; ³Zurich University Hospital, Zurich, Switzerland; ⁴Université Catholique de Louvain, Brussels, Belgium. (Tracking ID #2194243)

BACKGROUND: Adverse drug events occurring after hospital discharge are an important reason for readmissions within 30 days. However, these events need to be better characterized in order to find the most appropriate risk reduction interventions. The objective of this study was to describe instances of potentially avoidable readmissions due to adverse drug events in a medical population.

METHODS: In this nested case control study, we analyzed a random sample of 534 potentially avoidable 30-day readmissions from 10,275 consecutive discharges from the medical department of an academic medical center between July 1, 2009 and June 30, 2010. Potentially avoidable readmissions were determined using the previously validated SQLape algorithm. Medical records were independently reviewed by 9 trained physicians to identify those readmissions due to adverse drug events. Instances of over-prescribing (use of a drug without a valid indication), mis-prescribing (valid indication, but inappropriate duration, dose, choice of active agent, costs, interactions, or route of administration), under-prescribing (lack of a required drug given the previously known conditions of the patient), and other potential causes of adverse drug events were identified.

RESULTS: Among 534 cases of 30-day potentially avoidable readmissions reviewed, 80 (15 %) were partially or predominantly due to an adverse drug event. The drug classes that were the most frequently involved were: antineoplastic agents ($n=14$, 18 %), loop diuretics ($n=13$, 16 %), analgesics ($n=11$, 14 %), antibacterials for systemic use ($n=8$, 10 %) and antithrombotic agents ($n=7$, 9 %). Over-prescribing of drugs occurred in 9 % ($n=7$) of cases, mainly due to altered mental status on analgesics ($n=3$) and dehydration on diuretics ($n=2$). Mis-prescribing was identified in 24 % ($n=19$) of cases, mainly due to hypotension and acute renal failure on diuretics and antihypertensives ($n=8$), bleeding on overdosed or poorly monitored antithrombotics ($n=3$) and hypoglycemia on insulin ($n=3$). Under-prescribing involved 10 % ($n=8$) of the cases, most notably readmissions due to uncontrolled pain (analgesics, $n=3$) and volume overload and heart failure (lacking sufficient dosing of diuretics, $n=2$). The other 45 % ($n=36$) were cases where the adverse drug event was related to other factors, such as compliance issues ($n=6$).

CONCLUSIONS: Common drugs, such as analgesics and diuretics, were frequently involved in over-, mis- or under-prescribing, leading to adverse drug events that contributed to readmissions. Those drugs could be targets for interventions to prevent readmissions.

A DIAGNOSTIC SCORE FOR INSULIN RESISTANCE IN NON-DIABETIC PATIENTS WITH ISCHEMIC STROKE OR TRANSIENT ISCHEMIC ATTACK

Jin Xu; Catherine Viscoli; Walter N. Kernan. Yale School of Medicine, New Haven, CT. (Tracking ID #2184927)

BACKGROUND: Insulin resistance is associated with increased risk of progression from prediabetes to diabetes, cardiovascular disease, and ischemic stroke. Despite the known public health impact of insulin resistance, identification of non-diabetic patients with this condition remains challenging. Currently available methods are expensive, time consuming, or rely on fasting insulin measurements, which are not standardized across laboratory platforms. We sought to develop a simple, reliable instrument, not relying on fasting insulin, to screen for insulin resistance in patients with a recent ischemic stroke or transient ischemic attack (TIA).

METHODS: Subjects were non-diabetic men and women with ischemic strokes or TIA within the past six months, over age 40 years of age, and enrolled in the Insulin Resistance Intervention after Stroke (IRIS) trial. The 7262 subjects were randomly divided (60–40 %) into development and validation cohorts. In the development cohort, clinical features were analyzed in bivariate analysis for their association with insulin resistance as measured by the homeostasis model assessment for insulin resistance (HOMA-IR). Abdominal obesity was defined as waist circumference >88 cm in women and >102 cm in men. Body mass index ($\text{BMI}=\text{kg}/\text{m}^2$) was classified as <25 , 25–29, 30–35, and >35 . Elevated waist-hip (WTH) ratio was classified as >0.9 in men and >0.85 in women. Elevated systolic blood pressure (SBP) was defined as >130 mm Hg. Features that were significantly associated with HOMA-IR ($p<0.05$) were entered into a multivariable analysis. We used the magnitude of regression coefficients from the multivariable model to assign point values for a diagnostic scoring instrument. The performance of the instrument was then tested in the validation set using receiver operator characteristic (ROC) analysis.

RESULTS: Four features were retained in the multivariable regression analysis: BMI (25–29 kg/m^2 , 1 point; 30–35 kg/m^2 , 2 points; >35 kg/m^2 , 4 points), abdominal obesity (1 point), fasting glucose >100 mg/dL (4 points), and triglyceride-HDL ratio (1.6–2.3, 1 point; 2.4–3.5, 2 points; >3.6 , 4 points). Points for each feature were summed to yield a total score between 0 and 13, with increasing score predicting increasing degrees of insulin resistance. The area under the curve (aROC) for prediction of HOMA-IR >3 (our criterion for insulin resistance) was 0.77 in the development cohort and 0.78 in the validation cohort. A score of three had sensitivity and specificity of 85 and 50 %, respectively, in the

development cohort, and 86 and 53 %, respectively, in the validation cohort, for the prediction of HOMA-IR >3 . A score of seven had 91 % specificity but 44 % sensitivity for predicting HOMA-IR >3 in the development cohort, with similar performance in the validation cohort.

CONCLUSIONS: We have developed a simple, easy-to-use instrument for diagnosing insulin resistance in patients with a recent ischemic stroke or TIA. A score of three provided high sensitivity and moderate specificity. Use of a higher score as cutoff for insulin resistance would reduce unnecessary confirmatory testing but with lower sensitivity. Our instrument may assist clinicians in rapidly identifying candidates for further metabolic testing or direct referral for lifestyle counseling to prevent future adverse events including diabetes, coronary disease, and ischemic stroke.

A Health Literacy Assessment of Hospitalized Adult Patients and Written Discharge

Instructions Marina Arvanitis⁵; Alex Gertner²; Mona Xiao²; Eric Allman⁵; John Stephens¹; Edmund A. Liles⁴; Arlene E. Chung⁶; Daniel Jonas³; Darren A. DeWalt². ¹UNC Hospitals, Chapel Hill, NC; ²University of North Carolina, Chapel Hill, NC; ³University of North Carolina Chapel Hill, Chapel Hill, NC; ⁴University of North Carolina School of Medicine, Chapel Hill, NC; ⁵University of North Carolina at Chapel Hill, Chapel Hill, NC; ⁶University of North Carolina at Chapel Hill School of Medicine, Durham, NC. (Tracking ID #2200361)

BACKGROUND: One in five Medicare recipients is readmitted to the hospital within 30-days of discharge and excess hospital readmissions also occur to varying degrees in patients of all ages, especially those with certain high-risk diagnoses or health disparities, such as low health literacy. Written discharge instructions (DCI) are documents that patients must receive at the time of hospital discharge, ideally to summarize, clarify, and reinforce the important health information that patients need to maintain their health and avoid readmission. DCI are typically standard templates from electronic health record companies, which are often missing key instructions and not in lay-language. Attempts to standardize DCI content have shown inconsistent effects on patient comprehension, health outcomes, and readmission rates. As an initial step to improving the DCI we utilize at UNC Hospital, we aimed to assess the health literacy and associated characteristics of patients admitted to our General Internal Medicine services, as well as the readability, understandability and use of the DCI they receive.

METHODS: In this cross-sectional study at University of North Carolina Memorial Hospital, we recruited patients who were discharged from General Internal Medicine hospital services between June 23 and August 15, 2014. All adult patients who were being discharged to home after an unplanned admission, were acting as their own medical decision maker, had adequate vision to complete paper questionnaires, and were willing to receive a telephone call from a researcher after discharge were eligible to participate. We approached patients in their hospital room within 24 h of discharge, at which time the patient completed questionnaires of basic demographic information, a Short-Test of Functional Health Literacy (S-TOFHLA), a clock-draw test, and questionnaires of patient-reported physical and mental health, instrumental support, subjective socioeconomic status, and self-efficacy. We then made three attempts to contact the patient by telephone 5 to 14 days after discharge to assess their use and understanding of DCI. Two independent reviewers then systematically assessed the DCI reading level by Flesch-Kincaid and SMOG formulas and understandability by the Patient Education Materials Assessment Tool for Printable Materials (PEMAT-P). We used descriptive statistics and bivariate comparisons to assess patient and DCI characteristics.

RESULTS: Of 122 eligible patients, 55 participated in the study. The average participating patient age was 54, 48 % were female, 51 % reported their race as Caucasian and 40 % African-American. Nineteen percent of participants reported their highest level of educational completion as grade school, 28 % high school and 53 % some or more college. One-third of patients were Medicare recipients and 74 % reported having a primary care provider. Fifty one percent of patients reported having been admitted to a hospital on at least one other occasion within the last year, with a mean of 1.8 admissions and a range from one to 12. According to a health literacy assessment with the S-TOFHLA within 24 h of discharge, 61 % of patients had adequate, 11 % marginal and 28 % inadequate health literacy. According to a clock-draw test, which patients completed at the same time as the S-TOFHLA, 38 % of patients who were acting as their own medical decision maker, and therefore receiving their own discharge instructions, were cognitively impaired. Health literacy was correlated with cognition ($p=0.002$) and education ($p=0.05$), but not with patient-reported subjective socioeconomic status, self-efficacy, physical health, mental health or number of hospitalizations within the last year. The mean DCI length was 11 printed pages, with a range from 5 to 22. All DCI were found to be at a high school reading level with a mean grade level of 14 by Flesch-Kincaid and 15 by SMOG, with a range from approximately 10 to 17 by both formulas. Two independent reviewers systematically assessed DCI and found them all to be poorly understandable, with PEMAT-P understandability scores ranging from 0 to 46 % (scores less than 70 % suggest the written

document is poorly understandable). Of the 55 participating patients, we were able to reach 29 (53 %) by telephone 5 to 14 days after discharge. Of those, only 7 patients reported having their DCI available to reference at the time of the phone call, and only 6 patients reported reading their DCI after discharge.

CONCLUSIONS: The written DCI we provide to patients upon hospital discharge are long, written at a very high reading level, likely to be poorly understood, and are referenced by only a small percentage of patients after discharge. We should aim to create DCI templates that are better suited to the health literacy and cognitive status of patients at time of hospital discharge, and future research should focus on whether this will impact patient outcomes, including hospital readmission.

A HIGH NUMBER OF DAYS IN PAIN IS ASSOCIATED WITH MORE MISSED CLINIC VISITS AMONG HIV-POSITIVE WOMEN Stella Safo^{3, 2}; Chinazo Cunningham^{2, 3}; Arthur E. Blank^{1, 3}; E. Byrd Quinlivan⁶; Thomas Lincoln⁵; Oni J. Blackstock^{4, 3}. ¹Albert Einstein College of Medicine, Bronx, NY; ²Albert Einstein College of Medicine & Montefiore Medical Center, Bronx, NY; ³Montefiore Medical Center, Bronx, NY; ⁴Montefiore Medical Center/AECOM, New York, NY; ⁵Baystate Medical Center and Tufts University School of Medicine, Springfield, MA; ⁶University of North Carolina at Chapel Hill, Chapel Hill, NC. (Tracking ID #2199321)

BACKGROUND: Pain is highly prevalent among HIV-positive persons due to HIV infection itself and to other co-morbid conditions. Missed clinic visits is a widely used measure of retention in HIV medical care; poor retention care is associated with a lower likelihood of receiving antiretrovirals, a higher rate of antiretroviral failure, and worse survival. However, little is known about the relationship between pain and missed clinic visits, particularly among women. Therefore, using a multi-site cohort of HIV-positive women, we examined the relationship between pain and missed clinic visits.

METHODS: HRSA's Enhancing Access and Quality in HIV care for Women of Color Initiative was a longitudinal study of 921 HIV-positive women with varying levels of engagement in HIV medical care that took place at 9 community-based organizations and clinics in high HIV prevalence areas throughout the U.S. From 2010 to 2013, study staff conducted baseline interviews, which collected data on socio-demographic, risk behavior and clinical characteristics. Participants were followed for at least 12 months after the baseline interview. Pain was our independent variable of interest and was measured using the CDC's Healthy Days Symptoms Module; the module asks about the number of days in pain ("pain days") in the previous month. We categorized pain as: no pain days vs. low number of pain days (1–13 pain days) vs. high number of pain days (14–30 pain days), with 14 pain days being the median for those reporting ≥ 1 pain day. Our outcome variable was missed clinic visits during the 1-year period after the baseline interview. We assessed missed clinic visits by chart abstraction, and dichotomized our outcome as 0 or 1 missed visit vs. 2 or more missed visits. To examine the association between pain and missed clinic visits, we used multivariate logistic regression, adjusting for race, age, substance use, frequency of depressive symptoms, high-risk sexual behavior, insurance coverage, housing status, and antiretroviral use.

RESULTS: At baseline, median age was 42 years; 25.7 % were Hispanic and 68.6 % non-Hispanic black; 35.8 % reported high-risk sexual behavior and 13.1 % current high-risk substance use; 35.2 % reported frequent depressive symptoms; and 48.3 % reported taking antiretrovirals. In the previous month, 52 % of women reported no pain days, 23.7 % a low number of pain days, and 24.1 % a high number of pain days. Compared to women with no pain days, those with a high number of pain days were more likely to miss 2 or more clinic visits during the year (AOR=1.57, 95 % CI: 1.05–2.35). There was no significant difference in missed visits between those with no pain days and those with a low number of pain days (AOR=0.82, 95 % CI: 0.56–1.21).

CONCLUSIONS: Compared to HIV-positive women with no days in pain in the previous month, those with a high number of days in pain at baseline were more likely to miss visits during 1-year of follow-up. Women who experience more days of pain may represent an especially vulnerable group at risk for poor clinical outcomes. A better understanding of how pain may impact retention in care could guide efforts to improve retention in care of HIV-positive women.

A LONGITUDINAL ASSESSMENT OF DEPRESSIVE SYMPTOMS DURING INTERNAL MEDICINE RESIDENCY Mariah A. Quinn¹; Lingling Li²; Holly G. Prigerson³; Steven R. Simon². ¹University of Wisconsin, Middleton, WI; ²VA Boston Healthcare System, Boston, MA; ³Weill Cornell Medical College, New York City, NY; ⁴Harvard Pilgrim HealthCare Institute, Boston, MA. (Tracking ID #2196024)

BACKGROUND: Physicians experience considerable stress during residency training. Depressive symptoms, which are correlated with burnout and errors, occur frequently among housestaff. Relatively little is known about the frequency of depression among housestaff since the implementation of work-hour restrictions; there is a paucity of longitudinal data regarding mood disturbance during residency. We undertook this study

to assess the period prevalence of probable depression among a single cohort of Internal Medicine residents at a large training program.

METHODS: In 2006, we invited all Internal Medicine interns ($N=73$) at Brigham and Women's Hospital, Massachusetts, to complete an anonymous questionnaire assessing symptoms of depression, help-seeking, and use of time off work. We administered follow-up surveys throughout the subsequent 2 years of their training ($N=55$, after preliminary interns left the program prior to the second post-graduate year). The main outcome measure was the proportion of residents experiencing probable Major Depressive Disorder (MDD) during each year of training. Because of missing data, estimates of the cumulative incidence of probable depression were made based on complete cases, a conservative approach in which missing data was assumed to be a non-depressed, and Multiple Imputation.

RESULTS: Fifty-three individuals completed the survey during internship (response rate=74 %), of whom 38 completed at least one survey during the second or third year of residency (response rate over 2 years=69 %). Missing data did not vary by sex, age, prevalent depression, prior mental health care, or anti-depressant use at baseline (all $p>0.05$): a history of mental health care was associated with response to all surveys ($p=0.008$). Estimates of the period prevalence of probable MDD during *internship* were 35 % (95 % confidence interval [CI] [23, 49]) using a complete cases approach, 12 % (95 % CI [3, 20]) using a conservative estimation, and 21 % (95 % CI [0, 84]) using multiple imputation. When 3 years of longitudinal data were considered, the proportion of residents with at least one episode of probable MDD was 63 % (95 % CI [48, 79]) using the complete case approach, 36 % (95 % CI [22, 52]) by the conservative estimation approach, and 60 % (95 % CI [44, 73]) by multiple imputation. Prior receipt of mental health services and past history of personal diagnoses predicted being depressed at baseline, but not later in residency. Sadness was commonly reported, declining from 64 % during internship to 55 % during the third year, while anhedonia was prevalent but less so, declining from 38 % of respondents at the first time point to 19 % at the final time point. Active suicidal thinking was reported rarely (1 respondent); while passive suicidal thinking was reported at all time points except one (range 4–11 %). Over the course of the 3 years of residency, a total of 28 % of respondents reported that they utilized mental health services, while 8 % reported taking time off work for emotional issues.

CONCLUSIONS: Probable depression is common during internal medicine residency. More than 25 % of housestaff sought help for mental health symptoms. Rates of depression among housestaff remain high since the initiation of work hour's limitations. Given the possible consequences of depression among house officers, program directors and policy makers need to explore how programs for mental health screening and treatment can be effectively incorporated in residency training programs.

A LOOK INSIDE COMMUNITY HEALTH WORKERS' VISITS: A QUALITATIVE STUDY Julie B. Silverman²; Jim Krieger³; Karin M. Nelson¹. ¹University of Washington, VA Puget Sound, Seattle, WA; ²VA Puget Sound, Seattle, WA; ³Action for Healthy Food, Seattle, WA. (Tracking ID #2198635)

BACKGROUND: Utilization of community health workers (CHWs) shows promise in improving health outcomes and reducing disparities. However, incorporation of CHWs into the U.S. health care system has not been widely adopted. The reluctance to integrate CHWs into the health care team may be due in part to unfamiliarity with CHWs and their role within the medical team. While there is extensive literature on CHWs, these studies typically focus on the effectiveness of interventions and do not consider the skills and services of CHWs. CHWs are broadly described as educators, navigators, and promoters of healthy behaviors. However, the specifics of what they do remain unclear to the larger health care community. The purpose of this qualitative study is to describe the issues that CHWs confront and the actions they perform to help their clients.

METHODS: We performed a retrospective qualitative analysis of the open-text responses on encounter forms completed by CHWs in the Peer Support for Achieving Independence in Diabetes (Peer AID) study. This randomized controlled trial tested the effectiveness of a home-visit diabetes self-management support program for low-income individuals with poorly controlled diabetes. Participants were randomized to home visits by CHWs or to usual care. The CHWs were paid employees of Public Health - Seattle King County. After each home visit, the CHW filled out an encounter form documenting the health goal of the visit, the self-management strategies discussed and any participant concerns. Using ATLAS.ti, we performed inductive content analysis of the CHW encounter notes.

RESULTS: One hundred forty-five participants were randomized to the CHW intervention, resulting in a total of 634 encounter reports. CHW notes revealed large gaps in patient understanding of diabetes and diabetes self-management, including how to check sugar levels, what constitutes a healthy diet and the importance of taking medications as prescribed. To address these gaps, the CHWs taught participants how to read food labels, cooked and shared recipes, fixed glucose meters, explained the purpose and mechanism of each medication, and more. The encounter forms further revealed that despite appropriate

education and the desire to manage their diabetes more effectively, participants faced significant obstacles—such as the unaffordability of test strips or receipt of unhealthy foods from the food bank—to achieving optimal glycemic control. CHWs connected participants to community gardens, accompanied them to the grocery store to teach them how to find affordable and healthy foods, and helped fill out applications for discounted prescriptions. Visits with participants often uncovered frustration with and/or miscommunication between participants and their primary care providers (PCPs). The CHWs helped clarify the misunderstandings and coached participants on effective communications skills. In addition to these services, CHWs frequently called participants to check in regarding progress on their goals and to address any new questions or concerns.

CONCLUSIONS: CHWs may be able to provide services that are generally outside the scope of a primary care practice, such as connecting them to food banks and conducting grocery store tours. They also have the time to provide more thorough education that may not be possible in a 15-min PCP visit. CHWs may provide a valuable link between low-income patients and their providers.

A MULTICENTER RANDOMIZED TRIAL OF PHYSICIAN, PATIENT, AND PHYSICIAN/PATIENT INCENTIVES TO IMPROVE LIPID MANAGEMENT

David A. Asch^{2,4}; Andrea B. Troxel³; Walter F. Stewart⁶; Thomas D. Sequist¹; JB Jones⁶; Annemarie G. Hirsch¹; Karen Hoffer²; Jingsan Zhu³; Wenli Wang²; Amanda T. Rodlofski³; Antonette B. Frasz²; Mark G. Weiner⁸; Darra D. Finnerty²; Meredith Rosenthal⁵; Kelsey Gangemi³; Kevin G. Volpp^{3,4}. ¹Partners Healthcare System, Boston, MA; ²University of Pennsylvania, Philadelphia, PA; ³University of Pennsylvania, Philadelphia, PA; ⁴Philadelphia VA Medical Center, Philadelphia, PA; ⁵Harvard School of Public Health, Boston, MA; ⁶Sutter Health, San Francisco, CA; ⁷Geisinger Health System, Danville, PA; ⁸Temple University Health System, Philadelphia, PA. (Tracking ID #2200183)

BACKGROUND: Pay for Performance programs that provide financial incentives to physicians for improved patient outcomes are widespread and increasing, though their prospective evaluation has been limited. Programs that provide financial incentives to patients for improved patient outcomes are similarly increasing, and their prospective evaluation has also been limited. At the same time, a growing literature suggests that traditional financial incentives might be made more effective if insights from behavioral economics were incorporated. In this large multicenter trial, we tested behavioral economic designs for physician and patient pay for performance in the management of hyperlipidemia.

METHODS: We enrolled 1503 patients nested within 238 primary care physicians (PCPs) in a multicenter, cluster-randomized trial comparing four alternative approaches to reduce LDL cholesterol among patients with high cardiovascular risk or established cardiovascular disease. PCPs were randomly assigned to one of four study arms: physician incentives (PHYS), patient incentives (PAT), shared physician-patient incentives (SHARE), or control (CNTRL). PCPs in PHYS accrued quarterly payments of \$256 for each enrolled patient meeting a quarterly LDL goal of a 10 point reduction from the prior quarter or being at guideline (maximum 12-month payment=\$1024 per enrolled patient). Patients in PAT could accrue up to the same amount for meeting quarterly LDL goals, distributed through a daily 'regret lottery.' The lottery encouraged medication adherence but payouts were conditioned on reaching quarterly LDL goals as described. PCPs and patients in SHARE shared those possible financial incentives—each eligible for up to half of the yearly maximum of \$1024. PCPs and patients in CNTRL received no financial incentives, but did receive the same electronic pill bottles as the other arms used for monitoring adherence. The primary outcome was mean change in LDL at 12 months.

RESULTS: Patients in SHARE achieved the largest reductions in LDL (36.8 mg/dL), followed by patients in PHYS (30.0), CNTRL (26.6), and PAT (26.4). The rankings of these arms persisted at each quarterly measurement, including 3 months following the cessation of the intervention. Only patients in SHARE achieved a reduction in LDL statistically different from those in CNTRL (9.8; 95% CI: 4.3–15.3, $P<0.001$). Patients in SHARE also achieved LDL reductions significantly different from PAT (10.1, CI: 4.7–15.5, $P<0.001$) and PHYS (6.7, CI: 1.6–11.8, $P=0.010$). No other pairwise comparisons were statistically significant. At 12 months, 49% of patients in SHARE had achieved their LDL goal compared to 40% in PHYS, 40% in PAT, and 36% in C ($P=0.027$). At 15 months, 3 months after all incentives had stopped, reassessment of LDL values showed essentially no change from 12 months.

CONCLUSIONS: This study simultaneously represents one of the largest prospective trials of pay for performance for physicians and for patients, and the only trial to have tested a shared incentive between patients and physicians. While the control condition in this study itself reflected an enhancement over usual care, we found that neither substantial payments to physicians nor substantial payments to patients offer incremental benefits in LDL reduction compared to this control when used alone. However, the study demonstrates superior results when such payments are shared between physicians and patients.

A MULTIVARIABLE STATISTICAL MODEL OF RISK FACTORS FOR HYPOGLYCEMIA IN DIABETES MELLITUS Michael Weiner^{1,2}; Zuoyi Zhang²; Larry Radican³; Jon Duke^{2,1}; Xiaochun Li¹; Jarod Baker²; Kimberly Brodovicz³; Karen Kurtyka³; Jeff Stroup²; Ramachandra G. Naik³; Jeremy Leventhal²; Amaub Chatterjee³; Samuel Engel³; Swapnil Rajpathak³; Paige DeChant²; Shengsheng Yu³. ¹Indiana University, Indianapolis, IN; ²Regenstrief Institute, Inc., Indianapolis, IN; ³Merck & Co., Inc., Kenilworth, NJ. (Tracking ID #2199146)

BACKGROUND: Approximately 346 million people globally have diabetes mellitus. Although treatment improves outcomes, hypoglycemia (HG) from treatment or patient-related factors is dangerous and occurs in more than a third of patients with diabetes. Although risk factors for HG have been identified, no recent reports identified relative risks of multiple factors in comprehensive models. Our objective was to test multiple established risk factors in a multivariable statistical model, to determine the magnitude of independent association between the factors and HG. We hypothesized that older age, non-long-acting insulin, and sulfonylurea (SU) drugs would pose significant risk.

METHODS: We reviewed medical literature to identify studies that reported risk factors for HG in diabetes. We studied an urban population in a tax-supported medical institution on an academic medical campus. The study period was 2004 to 2013. Eligible patients were at least 21 years of age on 01 January 2004 and were prescribed or dispensed a drug for diabetes mellitus during the study period. An index date was defined as the first HG event for a patient during the study period. For patients who did not experience a HG event, their index date was a randomly selected visit date during the study period. The baseline period was defined as the 2 years prior to the index date. We excluded patients with a diagnosis of abnormal glucose tolerance complicating pregnancy or childbirth, and patients with fewer than two clinical encounters on separate dates during the baseline period. From a health information exchange in which the target institution participates, we extracted data about risk factors and demographics, from medical records of patients seen at the institution during the study period. Using this retrospective cohort, we conducted multivariable logistic regression analysis, with HG as the primary outcome. HG was defined as an outpatient plasma glucose value of less than 70 mg/dL (3.9 mmol/L), identified through laboratory reports, previously validated International Classification of Diseases diagnosis codes, or narrative text that underwent natural language processing (NLP). Significance was defined by a p -value of less than or equal to 0.05.

RESULTS: The cohort had 38,780 patients with the following characteristics: mean age of 56 years, 56% female, 33% white, 34% African-American, 19% with Medicaid, and 39% uninsured. HG was identified in 7589 (20%) of them. Of these, NLP identified HG in 5488, with 1566 identified only by NLP. In logistic regression, positive risk factors included the following: eating disorder (OR 30.5; 95% CI 1.6, 582.9), infection within 30 days (2.5; 2.2, 2.8), insulin other than long-acting insulin (without SU drug, 2.3; 2.1, 2.6; with SU within 90 days, 1.6; 1.3, 1.9; vs. non-insulin and non-SU), previous hypoglycemia within 12 months (2.2; 1.8, 2.7), African-American (1.8; 1.6, 1.9; vs. white), diabetic neuropathy (1.6; 1.4, 1.8), Medicaid (1.5; 1.4, 1.6), alcohol (1.4; 1.2, 1.7), chronic heart failure (1.4; 1.2, 1.6), without antibiotics (1.3; 1.1, 1.5), antibiotics with SU (1.3; 1.0, 1.8), dementia or falls (1.3; 1.2, 1.5), and A1C 6.5 or less (1.1; 1.0, 1.3; vs. greater than 6.5 to less than 7.0). Negative risk factors included serum calcium mg/dL (OR 0.5; 95% CI 0.5, 0.5), age 85 years or more (0.6; 0.5, 0.8; vs. 45 to 64), long-acting insulin plus a SU within 90 days (0.6; 0.5, 0.8), Hispanic (0.6; 0.5, 0.8), and age 75 to 84 years (0.9; 0.8, 1.0).

CONCLUSIONS: HG was common in this population. NLP was a useful tool, uniquely identifying 21% (1566/7589) of the HG group. Many risk factors for HG were identified, including modifiable factors such as eating disorders, infections, and drugs. Insulin other than long-acting insulin, and SU drugs, were confirmed as important risks. Surprisingly, the oldest ages (age 75 years or more) posed less risk; this may reflect diminished awareness of hypoglycemia, greater attention to medical management, or other unmeasured factors in this population. Results suggest that tight diabetes control (A1C of 6.5 or less) poses greater risk of HG. These results can be used to develop decision support tools for primary care clinicians at the point of care.

A NARRATIVE REVIEW OF MEDICATION-RELATED CLINICAL DECISION SUPPORT Clare L. Brown¹; Sarah P. Slight²; Andrew K. Husband²; Neil W. Watson⁴; David W. Bates³. ¹University of Durham, Sunderland, United Kingdom; ²Durham University, Stockton on Tees, United Kingdom; ³Brigham and Women, Boston, MA; ⁴Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, United Kingdom. (Tracking ID #2193237)

BACKGROUND: Medication errors cause substantial patient harm and can occur at any stage of the medication use process. Health information technology, such as Computerized Physician Order Entry (CPOE) and Clinical Decision Support (CDS), may be used to reduce the likelihood of these errors. Medication-related CDS provides automated guidance and support to clinicians at the point of prescribing. CDS can provide drug-drug interaction (DDI) checks, drug allergy checks, dosing guidance, duplicate therapy checks and formulary decision support. CDS has been associated with a range of benefits such as improved patient safety, improved standards of care and reduction in healthcare costs. We

reviewed the recent literature around medication-related CDS functionality and reflected upon the issues pertinent to its future development.

METHODS: We searched for papers in Medline Ovid and Embase Ovid, using MeSH terms and key words including 'clinical decision support', 'decision support systems' and 'computerized physician order entry' with a date range of 2007 to 2014. Specific MeSH terms and keywords relevant to five basic CDS functionalities were also used. We included all publication types, all types of CPOE systems and all clinical settings. Only English language papers were selected for further review. Reference lists, papers from world leading experts and the 'other citing articles' function were also used to identify additional articles. Titles and abstracts were initially screened to identify relevant papers, followed by the full text by one reviewer. A total of 896 articles were identified across each of the five areas, of which 184 were included.

RESULTS: The success of CDS very much depends on users finding alerts valuable and acting on the information received. CDS functionality is continually evolving in response to users' needs. Assigning a severity level to DDI alerts has been shown to improve alert acceptance. Additionally, improving alert specificity and severity was found to be an important factor for realising the benefits of DDI alerts. Maintenance of accurate records and ability to carry out cross-sensitivity checks are key to the production of appropriate drug-allergy checks. Patient specific parameters should be incorporated into the decision-making algorithms to improve the accuracy and appropriateness of drug-dosage alerts; furthermore, suggested doses should be appropriately rounded to facilitate administration and include order sentences sequenced to reflect those most commonly used. How the CDS system is configured is important for drug-duplication checks and to avoid potentially exposing the patient to toxic drug levels. The knowledge base(s) for drug-formulary alerts must be accurate and reviewed regularly in order to produce relevant alerts and encourage formulary adherence. Finally, consideration of human factors principles during the design and implementation of CDS is critical and has been shown to improve system effectiveness.

CONCLUSIONS: CDS is still undergoing development. The implementation of automation in healthcare has surged in recent years and this is likely to continue. Moving forward, integration of patient specific parameters into CDS decision-making checks and consideration of human-factors design principles will be central to obtaining the potential benefits of CDS. Such advancements in CDS should enable it to have a much greater impact for improving patient care.

A PALLIATIVE NURSE PRACTITIONER INTERVENTION TO IMPROVE ADVANCE CARE PLANNING AND SUPPORTIVE CARE IN PATIENTS WITH ADVANCED CANCER Anne Walling²; Sarah F. D'Ambruso²; Sara Hurvitz²; Robin

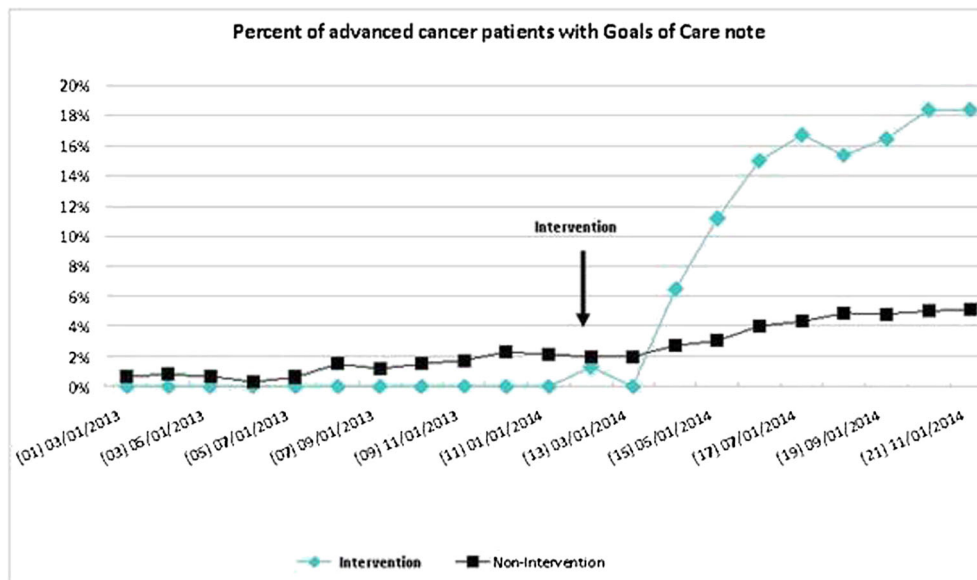
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BACKGROUND: The simultaneous care model for palliative care provides high quality care for patients with serious illness. Unfortunately, the U.S. healthcare system falls short of this goal, even in patients with advanced cancer. As the first phase of a system-wide advance care planning program, we used implementation science methods to test if a nurse practitioner (NP) with structured palliative care training using evidence-based principles of communication and a model that cultivates prognostic awareness with palliative care physician oversight can improve the quality of advance care planning and supportive care provided to patients with advanced cancer in an academic health system.

METHODS: Patients with advanced cancer were identified from the electronic health record (EHR) based on oncology visits and treatments and using free text analysis of oncology notes and imaging. An NP was integrated into the clinic of two oncologists who treated primarily breast cancer with the goal of seeing patients with incurable disease soon after presentation and then following patients in continuity. The oncologist documented prognosis and provided a warm handoff in referring the patient to the NP. Based on standardized assessments administered by the NP, patients were linked into resources for psychosocial support and symptoms were addressed. The NP focused on goals of care and valued future health states in advance care planning, which was documented in a Goals of care note in the EHR. The intervention was evaluated using EHR data to compare rates of advance care planning documented in Goals of care notes and hospice referral among decedents for patients with advanced cancer seen by the two target oncologists compared to all other advanced cancer patients in clinics without the NP intervention.

RESULTS: Of 10,228 patients with active cancer, 2535 patients had advanced cancer and were treated by 39 oncologists. Advance care planning as represented by EHR Goals of care notes increased for patients of the two intervention oncologists compared to patients of the other oncologists as seen in the run chart in the Figure. Hospice referral before death was not different between the two groups at baseline, but was significantly higher for patients of intervention oncologists compared to patients of control oncologists (50 % v. 19 %, $p=0.03$) over the 9 months of follow up.

CONCLUSIONS: This embedded NP-based model of advance care planning and palliative care delivery within an oncology clinic improves advance care planning and early results suggest better end of life care as evidenced by hospice enrollment.



A PATIENT-CENTERED APPROACH TO IMPROVING DISCHARGE INSTRUCTIONS David S. Pilkington³; Jessica R. Howard-Anderson³; Rachel Brook³; Ashley Busuttil¹; Nasim Afsarmanesh². ¹UCLA, Los Angeles, CA; ²UCLA Health, Pacific Palisades, CA; ³University of California, Los Angeles, Los Angeles, CA. (Tracking ID #2199487)

BACKGROUND: The transition from hospital to home is a crucial time in a patient's hospitalization as the inpatient team aims to create a seamless transfer to the ambulatory

providers. Patient comprehension of their post discharge care is critical for ensuring patient safety and wellness after a hospital discharge. With the advent of the electronic health record (EHR), more hospitals use templates and auto-populated discharge instructions. Studies have been done evaluating the EHR's affect on resident documentation - including their tendency to promote automaticity instead of creative clinical thinking. However, interestingly, patient satisfaction with and comprehension of EHR derived discharge instructions has not been robustly evaluated. The goal of our study was to use a patient-centered approach to evaluate patients' knowledge of and satisfaction with the new EHR generated discharge instructions.

METHODS: Over a 3-month period (07/02/2014–09/24/2014), we conducted structured phone interviews of all patients discharged within 3 weeks from the general internal medicine teams at a tertiary academic medical center. We excluded patients who were discharged to nursing facilities or hospice, or did not speak English. The interview script asked patients if they could clearly identify key pieces of information on their discharge paperwork including medications, follow-up appointments, expected symptoms, and contact phone numbers. Additionally patients were asked questions regarding comprehension of their medication regimen and details regarding follow-up appointments. Lastly, using a 1–10 numeric scale, patients were asked to rate their satisfaction with the discharge process.

RESULTS: Of the 235 eligible patients contacted, 47 patients were successfully interviewed (20 %); 135 patients (57 %) were unable to be reached, 46 patients refused (20 %) and 7 patients (3 %) did not read the discharge paperwork. Overall patients reported being able to identify their medication regimens, and understand changes in dosages and indications for specific treatments greater than 90 % of the time. One-hundred percent of patients reported that they could identify their scheduled follow-up appointments on the discharge paperwork. However only 76 % reported that they were aware of scheduled or to-be scheduled follow up appointments on discharge. Most notably, 13 % of patients could not identify warning symptoms to be aware of on discharge, and 33 % of patients were unaware of routine symptoms to expect after discharge. Lastly, 13 % of patients could not locate any emergency contact information for a physician on the discharge paperwork. Overall satisfaction with the discharge paperwork was 8.8 [SD 1.4] on a scale of 1–10.

CONCLUSIONS: While patient satisfaction was overall adequate with our discharge instructions, these interviews identified important gaps in our discharge practices that may hinder our patients' ability to fully understand their post-discharge care. For example, our institution has infrastructures in place to schedule 100 % of patients with follow-up appointments. However only 76 % of patients interviewed stated that they were scheduled for follow up appointments, or knew follow-up appointments would be scheduled for them. This discrepancy existed despite patients reporting being able to identify the post-discharge appointment section of the discharge paperwork. We think this discrepancy occurred because in our discharge instructions, follow up appointments needing to be scheduled (i.e. not secured prior to patient discharge) are located in a different place than the already scheduled appointments, thereby causing significant confusing. While this problem is specific to our institution, it provides a nice example of an area for intervention that we would have never known about had we not interviewed patients themselves. In addition, there was a significant percentage of patients who expressed confusion over both warning symptoms and expected symptoms post-discharge. Lastly, patients also described difficulty finding information on who to call if they had concerns when at home, after discharge. Both being aware of routine recovery symptoms, as well as knowing how to proceed if a question arises at home, can reduce patient anxiety on discharge and possibly prevent readmissions. Future steps will involve revising our institution's discharge instructions to more clearly elucidate when follow-up appointments are made, as well as clarifying expectations for post-discharge care and recovery. As the nation continues to strive to improve patient safety while adapting EHRs, it will be imperative that patient insights continue to be considered and implemented in the care delivery process.

A PILOT STUDY EXAMINING HEALTH LITERACY PROMOTION PRACTICES AMONG HEALTHCARE PROFESSIONALS Allison Squires¹; Shonna Yin²; Sherry A. Greenberg¹; Maryanne M. Giulianti¹; Margaret V. McDonald³; Lisa Altschuler²; Tara Cortes¹. ¹New York University, New York, NY; ²NYU School of Medicine, New York, NY; ³Visiting Nurse Service of New York, New York, NY. (Tracking ID #2198606)

BACKGROUND: As health services delivery becomes more interprofessional it is important to understand how different professionals address health literacy with their clients. Practice differences related to health literacy contribute to health disparities and patient outcomes. The purpose of this study was to pilot test a series of questions that assess health literacy promotion practices in a cohort of nurses, physicians, and social workers. It was hypothesized that health literacy-informed practices are an important way to promote interprofessional collaboration and avoid duplication of work and at the same time allow for reinforcement of important patient education content, enhancing patient self-management.

METHODS: The previously non-validated 17 questions were derived from Schwartzberg and Turner's (2007) list of practices promoting health literacy. We first completed an interprofessional content validation of the potential questions. Through the use of expert raters, as a pre-data collection step content validation evaluates questions for their relevance individually and as a group when measuring a phenomenon. Item and scale level scores result. Expert raters from medicine ($n=10$), nursing ($n=8$), and social work ($n=2$) participated in the content validation process. Social work and nurse raters were grouped to create an even comparison since more social workers were not available for the exercise. A cross-sectional pilot study was then conducted as part of a larger survey aimed

at evaluating perspectives on interprofessional practice. Participants rated the frequency with which they used the practices from 1=never to 5=always. Content validity scores of the questions were calculated using a modified kappa score. Trends in reported practices are described.

RESULTS: The scale content validity rating among physicians was 0.74 and among the nurse-social work cohort was 0.89. Each group of expert raters scored 3 items as fair or poor health literacy practice assessment measures, with only one low scoring item in common between the two groups. While data limitations around normalized distributions do not allow us to compare the means for significant differences, it appears that the relevance of certain practices around promoting health literacy in patients differ between groups. For the pilot test, 42 out of 53 eligible participants completed the health literacy assessment practices. Participants reported being most likely to use what they perceived as simple language to explain information to patients (4.05/5) and the use of models or drawing pictures as the least frequent strategy (2.73/5 and 2.9/5 respectively). All other responses ranged in the "sometimes" range between 3.02 and 3.93/5. While the sample is too small for comparison at this time, there do appear to be trends in practice differences between the professions in terms of which strategies they report using most.

CONCLUSIONS: Our data suggest that these questions designed to assess health professional's reported health literacy promotion practices have potential in the study of outcomes of interprofessional patient care. The content validation exercise revealed early differences in perceived relevance of different practices by experts. We plan to further examine these trends as we accumulate a larger dataset from these groups.

A PILOT STUDY OF A DIABETES PREVENTION PROGRAM IN AN URBAN RESIDENCY PRACTICE Rose Coady; Catherine D. Agricola; Robert J. Fortuna; Brett Robbins. University of Rochester, Rochester, NY. (Tracking ID #2193959)

BACKGROUND: There are an estimated 54 million Americans who have pre-diabetes, many of whom will progress to type 2 diabetes (T2D) without intervention or lifestyle modifications. The Diabetes Prevention Program (DPP) is an intensive 22 week intervention involving both group and individual sessions. It has been studied in controlled trials and proven to be clinically and cost effective, but the DPP model has not been studied in a real-world setting. We examined its effectiveness in an inner city, residency primary care clinic environment.

METHODS: We modeled the Rochester Diabetes Prevention Program (R-DPP) after national DPP standards and the core principles of self-determination theory. We included patients with pre-diabetes (HbA1c 5.7–6.4 %) and those with morbid obesity regardless of the HbA1c. The goal of the program was to reduce the progression and development of T2D. We measured body mass index (BMI), weight measured in pounds (lbs), low-density lipoprotein (LDL), hemoglobin A1c (HbA1c), and exercise activity time measured in minutes per week (min/wk) before and after the intervention.

RESULTS: To date, 22 participants have completed R-DPP. The mean age of the cohort was 48 years with 77 % female, 72 % African American, and 45 % with public health insurance, primarily Medicare or Medicaid. Participants experienced a mean weight loss of 7 lbs (232 lbs to 225 lbs, $p<0.0001$) and a decrease in BMI of 1.7 (38.8 to 37.1, $p=0.012$). Self-reported exercise time increased by 68.4 min/week (40.6 min/week to 109 min/week). Participants also experienced a decrease in HbA1c (7.4 to 7.0 %, $p=0.093$), total cholesterol (173 mg/dL to 165 mg/dL, $p=0.003$), and LDL (93 mg/dL to 88 mg/dL, $p=0.023$).

CONCLUSIONS: The R-DPP was an effectiveness pilot trial that reached an at-risk urban population in a resident clinic. It promoted positive behavior change leading to an increase in participants' weekly exercise with significant weight loss and improvements in HbA1c, total cholesterol and LDL.

Average Measures Before and After the R-DPP

BMI (kg/m ²)	Before R-DPP	After R-DPP	p value
Weight (lbs)	38.8	37.2	0.012
HbA1C (%)	232	226	<0.001
Total Cholesterol (mg/dL)	7.4	7.0	0.09
LDL (mg/dL)	173	166	<0.001
Exercise Time (min/week)	93	88	0.02

A RANDOMIZED COMPARATIVE EFFECTIVENESS TRIAL OF A PRIMARY CARE-COMMUNITY LINKAGE FOR PREVENTING TYPE 2 DIABETES Ronald T. Ackermann¹; David T. Liss¹; Emily Finch¹; Laura Hays²; David G. Marrero³; Chandan Saha⁴. ¹Northwestern University, Chicago, IL; ²Indiana University School of Nursing, Indianapolis, IN; ³Indiana University School of Medicine, Indianapolis, IN; ⁴Indiana University, Indianapolis, IN. (Tracking ID #2200110)

BACKGROUND: The U.S. Diabetes Prevention Program (DPP) showed that resource-intensive lifestyle interventions supporting daily physical activity and modest weight loss can cut the rate of developing type 2 diabetes in half. This randomized comparative effectiveness trial evaluated the weight loss effectiveness of a referral-based, 'YMCA Model' for offering the Diabetes Prevention Program (DPP) lifestyle intervention to adult primary care patients at high risk for developing type 2 diabetes.

METHODS: Five hundred nine overweight/obese, low-income, non-diabetic, adult primary care patients with elevated blood glucose were identified in 9 urban primary care settings and individually randomized to receive (1) standard care plus brief lifestyle counseling (SC); or (2) being offered a group-based adaption of the DPP delivered free-of-charge by the YMCA (YDPP). The primary outcome was mean difference in weight loss at 12 months. Intention-to-treat (ITT) analyses used longitudinal linear or logistic regression, with missing observations multiply imputed. Instrumental variables (IV) regression estimated weight loss effectiveness among participants completing ≥ 9 intervention lessons - a commonly cited threshold for high engagement in the DPP. Secondary outcomes included attendance in the referral-based intervention and changes in intermediate cardiometabolic risk factors across treatment arms.

RESULTS: At enrollment, participants had a mean age of 51, BMI 36.8 kg/m², and HbA1c 6.0 %; 57 % reported African American race and 61.3 % reported annual household incomes $< \$25,000$. In the YDPP arm, 161 (62.6 %) participants attended ≥ 1 lesson and 103 (40.0 %) completed ≥ 9 lessons. In ITT analysis, mean 12-month weight loss was 2.3 kg (95 % CI 1.1 to 3.4 kg) more for YDPP arm participants, compared to SC. In IV analyses, persons attending ≥ 9 lessons had a 5.3 kg (95 % CI, 2.8 to 7.9 kg) greater weight loss than without the intervention.

CONCLUSIONS: A 'YMCA model' for DPP delivery achieves meaningful weight losses at 12 months among low income adults. For every 5 high-risk primary care patients who were offered the intervention, about 1 additional person achieved and maintained ≥ 5 % weight loss after 12 months. This is the largest randomized intervention trial to date evaluating the uptake and weight loss effectiveness of community delivery of the DPP. It demonstrates that a primary care-community linkage is one promising approach for helping to slow the growing burden of type 2 diabetes in the U.S.

A RANDOMIZED CONTROL TRIAL OF OPT-IN VERSUS OPT-OUT ENROLLMENT INTO A DIABETES MANAGEMENT INTERVENTION

Jaya Aysola²; Andrea B. Troxel²; David A. Asch¹; Emin Tahirovic²; Kelsey Gangemi¹; Amanda T. Hodlofski¹; Jingsan Zhu¹; Kevin G. Volpp¹. ¹University of Pennsylvania, Philadelphia, PA; ²University of Pennsylvania, Philadelphia, PA. (Tracking ID #2199278)

BACKGROUND: Improving enrollment rates into research trials is central to ongoing efforts to maximize the external validity of research findings. This is particularly important for behavioral interventions, in which self selection in enrollment may be relevant in terms of intervention effectiveness. Opt-out defaults have been shown to influence decisions without restricting choice, but have primarily been tested in contexts that require a one-time decision such as retirement savings allocations or the release of childhood vaccination records. To examine the impact of an opt-out enrollment strategy for behavioral interventions, we conducted a randomized controlled trial comparing an opt-out recruitment strategy versus a conventional opt-in strategy on participation rates and adherence to a 6-month intervention for patients with poorly controlled diabetes.

METHODS: We recruited participants between November 2013 and March 2014 from two internal medicine primary care sites at the University of Pennsylvania Health System who met the following eligibility criteria: 1) age 18–80 years; 2) confirmed diagnosis of diabetes; and 3) a measured hemoglobin A1c greater than 8 % in the past 12 months. Eligible patients were randomized into opt-in and opt-out arms, using a 5:1 then 9:1 randomization ratio (opt-in versus opt-out). Participants in the opt-in arm received a letter inviting them to contact the study team if interested in enrolling in the study. Participants in the opt-out arm received a letter stating that they have been enrolled into a diabetes program being conducted at their practice and would be contacted within ten days to set up the initial appointment, at which point they could decline participation. Participants in both arms who agreed to participate received free wireless glucometers and blood pressure cuffs, automated messages regarding their glycemic control, ongoing support from nurse practitioners, and a lottery-based incentive tied to daily device use for the first 12 weeks of the study followed by a 12 week period of observation without incentives. Our primary outcomes were participation rate, defined as the proportion of enrollees invited to join the study via opt-in or opt-out who attended the baseline visit, and adherence to daily glycemic monitoring. We were powered to detect a difference of 20 % between arms in adherence to daily glycemic monitoring. As a secondary outcome we assessed attrition rates at 3 and 6 months.

RESULTS: Of the 569 eligible participants who received a recruitment letter, 496 were randomized to the opt-in arm and 73 to the opt-out arm. There were no differences in baseline characteristics between these groups. Participation rates were 13 % in the opt-in arm compared to 38 % in the opt-out arm (p value < 0.001). Of those who participated,

6 months attrition rates were 13 and 32 % in the opt-in and opt-out arms respectively (p value = 0.04). Amongst those who attended their 3-month visit, attrition rates at 6 months were similar (13 % opt in, 17 % opt out, p -value 0.72). There were significant but small differences between arms in the mean decline in adherence rates to glucometer usage during the first 12 weeks (opt-in vs. opt-out: -0.01 vs. -0.03 ; p -value = 0.02) and the last 12 weeks (opt-in vs. opt-out: -0.02 vs. -0.008 ; p -value = 0.02).

CONCLUSIONS: Participation rates were threefold higher amongst patients recruited through an opt out default compared to a conventional opt-in approach with no significant compromise in adherence to the intervention at 6 months. This suggests that opt-out defaults, where clinically appropriate, could be a useful approach for increasing the external validity of trials testing behavioral interventions in clinical settings.

A RANDOMIZED CONTROLLED TRIAL EVALUATING THE EFFECT OF COMPASS (COLLEAGUES MEETING TO PROMOTE AND SUSTAIN SATISFACTION) SMALL GROUP SESSIONS ON PHYSICIAN WELL-BEING, MEANING, AND JOB SATISFACTION

Colin P. West; Liselette Dyrbye; Daniel Satele; Tait Shanafelt. Mayo Clinic, Rochester, MN. (Tracking ID #2199380)

BACKGROUND: Burnout and low job satisfaction are all too common among physicians. However, studies evaluating interventions to address these issues have been limited. Application of validated instruments has been uncommon, and prior studies have been largely observational. A recent randomized study of facilitated physician meetings (West CP et al., JAMA Intern Med 2014;174(4):527-33) demonstrated improvement in meaning and reduced depersonalization in the intervention arm, but it is unknown whether less intensive and less structured forms of this intervention would also be beneficial for physician well-being.

METHODS: We conducted a randomized controlled trial of a 6-month intervention involving 12 biweekly one-hour meetings of self-formed groups of 6–8 academic internal medicine physicians, termed COMPASS Groups (Colleagues Meeting to Promote And Sustain Satisfaction). Each intervention session consisted of a brief 15-min group discussion of an assigned topic relevant to the physician experience and drawn from prior physician well-being literature, followed by 45 min for a shared lunch or other group activity as determined by each group itself. Each participant received \$20 per session for meal expenses. Control participants were wait-listed to complete their own small groups after the initial 6 months to ensure equity in study reimbursement opportunities. The small group topics included work-life balance, medical mistakes, meaning in work, and resiliency, among other topics relating to the physician experience. Participants completed surveys at baseline and then quarterly. Surveys included linear analog self assessment of overall quality of life (QOL), the Maslach Burnout Inventory, the 2-item PRIME-MD depression screen, the Empowerment at Work Scale assessing meaning from work, the Social Isolation PROMIS instrument, and the Physician Job Satisfaction Scale. The trial groups were compared using generalized estimating equations for repeated measures.

RESULTS: Of 125 study volunteers, 64 and 61 participants were randomized to the intervention and control arms of the study, respectively. At baseline, no statistically significant differences were observed between the study groups for any well-being variable. Results are shown in the Table ($p < 0.05$ designated with an asterisk in the Table for relevant outcome variables). Preliminary data also suggest sustained benefits up to 6 months after the end of the study intervention period for each outcome.

CONCLUSIONS: Study participants engaged in biweekly meetings with colleagues supported by modest study funds experienced statistically and clinically significant improvements in multiple domains of well-being and satisfaction, including overall QOL, the depersonalization and personal accomplishment domains of burnout, meaning from work, social isolation, and job satisfaction. These results suggest that a relatively non-intensive intervention involving self-selected physician small group meetings can be effective in promoting physician well-being, meaning from work, and job satisfaction.

Absolute Change in Outcomes from Baseline to 6 Months.

Outcome	Intervention (n=64)	Control (n=61)
Poor QOL*	-13.0 %	-6.2 %
Overall QOL Score (0–10)*	+0.72	+0.20
High Emotional Exhaustion	-10.0 %	-7.3 %
High Depersonalization*	-4.4 %	+2.4 %
Low Personal Accomplishment*	-10.2 %	+8.8 %
Overall Burnout	-6.1 %	-7.1 %
Positive depression screen	-7.5 %	-8.7 %
High Meaning from Work*	-0.8 %	-8.7 %
Social Isolation PROMIS Score (1–5)*	-0.15	+0.38
High Job Satisfaction*	+15.7 %	+7.8 %
Likelihood of Leaving in Next 2 Years*	+0.7 %	+5.8 %

A RANDOMIZED CONTROLLED TRIAL TO DECREASE JOB BURNOUT IN FIRST-YEAR INTERNAL MEDICINE RESIDENTS USING A FACILITATED DISCUSSION GROUP INTERVENTION Jonathan Ripp¹; Robert Fallar¹; Deborah R. Korenstein². ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Memorial Sloan-Kettering Cancer Center, New York, NY. (Tracking ID #2191957)

BACKGROUND: Job burnout is common in internal medicine (IM) trainees and has been associated with limited peer and professional support, depression, unprofessional behavior and sub-optimal patient care. Facilitated group discussion has reduced burnout among self-selected practicing clinicians. We hypothesized that a similar group discussion-based intervention would reduce the development of burnout among first-year IM resident physicians.

METHODS: We conducted a single-center randomized trial between June 2013 and May 2014 in an academic IM residency program. We selected participants from a convenience sample of 51 eligible incoming IM residents and randomly assigned groups of 3 participating residents to intervention or control. Intervention arm groups aimed to hold twice monthly discussion sessions (18 total). Expert group discussion facilitators led the sessions which were each organized around a theme (e.g. death and dying, difficult patients, coping mechanisms, etc.). Participants received lunch and one hour away from clinical duties. Due to residency program requirements, we were unable to hold the sessions in place of existing educational meetings. Residents in the control arm were provided lunch vouchers. We administered surveys at study onset and completion. The primary outcome was job burnout using the validated Maslach Burnout Inventory. Secondary outcomes included attitudinal items related to professional behavior and sub-optimal patient care, and fatigue as measured by the validated Epworth Sleep Scale. All metrics were dichotomized and changes in pre-post values were compared using chi-squared analyses or Fisher's Exact test when cell sizes were small ($n < 5$). When comparing changes in scores, the data were analyzed using analysis of variance techniques.

RESULTS: All 51 eligible residents consented to participate; 39 (76 %) completed both surveys. Neither burnout prevalence at the start of training (10/21 (48 %) v. 7/17 (41 %), $P = 0.69$) nor incident burnout (9/11 (82 %) v. 5/10 (50 %), $P = 0.18$) over the course of the year differed between intervention and control arms, though more intervention residents had high depersonalization scores at study end (18/21 (86 %) v. 9/17 (53 %), $P = 0.04$). (Table) Secondary outcomes did not differ between groups. During informal feedback, many intervention residents revealed that sessions did not effectively free them from their clinical responsibilities or eliminate other daily requirements.

CONCLUSIONS: A facilitated group discussion intervention was ineffective in decreasing job burnout in resident physicians. The failure of this approach highlights the difficulty of decreasing burnout in trainees. Failure of the intervention may be attributable to the unique challenges of residency training or to the fact that the intervention was performed in a convenience sample and not in a self-selected group. Future discussion-based interventions designed to mitigate the development of burnout in IM residents should consider a voluntary integrated format free from clinical duties.

Incidence and Prevalence of Job Burnout, Depersonalization and Emotional Exhaustion in a Cohort of Internal Medicine Resident Physicians Participating in a Randomized Controlled Study Examining the Impact of Facilitated Discussion

Residents' characteristic	No. (%) Intervention Arm (n=21)	No. (%) Control Arm (n=17)	P value
Overall Burnout			
Burnout Prevalence at the Start of Training	10/21 (48 %)	7/17 (41 %)	.70
Burnout prevalence at the end of PGY-1	18/21 (86 %)	12/17 (71 %)	.43
Burnout incidence	9/11 (82 %)	5/10 (50 %)	.18
Depersonalization			
High DP subscores at the start of training	6/21 (29 %)	4/17 (24 %)	1.00
High DP subscores at the end of PGY-1	18/21 (86 %)	9/17 (53 %)	.04
High DP incidence ^a	12/15 (80 %)	6/13 (46 %)	.11
Emotional exhaustion			
High EE subscores at the start of training	5/21 (24 %)	3/17 (18 %)	.71
High EE subscores at the end of PGY-1	13/21 (62 %)	12/17 (71 %)	.73
High EE incidence ^b	10/16 (63 %)	9/14 (64 %)	1.00

Abbreviations: PGY-1 indicates postgraduate year 1; DP depersonalization; EE, emotional exhaustion.

a Percentage of residents who start training without burnout or high DP and develop burnout and high DP by the end of PGY-1.

b Percentage of residents who start training without burnout or high EE and develop burnout and high EE by the end of PGY-1.

A RANDOMIZED TRIAL OF SELF-SAMPLING FOR HUMAN PAPILLOMA VIRUS AMONG MINORITY IMMIGRANT WOMEN IN NEED OF CERVICAL CANCER SCREENING: FINDINGS FROM THE SOUTH FLORIDA CENTER FOR REDUCING CANCER DISPARITIES Olveen Carrasquillo; Erin N. Kobetz-Kerman; Yisel Alonzo. University of Miami, Miami, FL. (Tracking ID #2199041)

BACKGROUND: Latina immigrants and Haitian women are 15–30 percentage points less likely to be screened for cervical cancer than Non-Hispanics whites (NHWs). Testing for the Human Papilloma Virus (HPV) is gaining increased acceptance for cervical cancer screening. A major advantage of this approach is that with minimal instruction women can perform the sampling themselves.

METHODS: Our study was conducted using the Community Based Participatory Research framework in three ethnic communities in Miami-Dade County: Hispanic, Haitian and one mixed. Each of three trained Community Health Workers (CHWs) recruited 200 women aged 30–65 years from various community-based locations and scheduled a subsequent 30-min assessment. Women were randomized to one of three arms: 1) culturally tailored health education materials 2) an individualized 60 min CHW led health education session followed by CHW navigation to a participating health center for a Pap Smear 3) Individualized health education and the option of having HPV home self-sampling or CHW navigation for a Pap smear at a health center. Our primary outcome was self-report of having cervical cancer screening assessed at 6 months after the initial evaluation done by a research assistant blinded to allocation status. Women lost to follow-up were considered as not screened. At study exit, all women not having had screening were offered HPV self-sampling.

RESULTS: We assessed 4608 women of whom 1156 were study eligible. Having had a Pap smear in the last 3 years (51 %) and age (15 %) were the primary reasons for study ineligibility. We were unable to schedule an initial baseline assessment with 38 % of study eligible women and 11 % declined to participate. Among the 601 women randomized, mean age was 47+9 years, 67 % had household incomes under \$20,000, and 76 % lacked health insurance. These characteristics and loss to follow-up at 6 months (9–12 %) were similar across all three arms. Using intention to treat, at 6 months 29 % of women randomized to health education reported being screened for cervical cancer versus 38 % in the CHW navigation group and 73 % in the HPV sampling group ($P < 0.05$ for group 2 versus group 1, and < 0.01 for group 3 versus group 2 or 1. In pre-planned subgroup analysis, in one community (mixed) where barriers to traditional pap smears screening were minimized, rates of screening were more attenuated in groups 2 versus 3, 58 and 73 %, respectively as compared to 27 % in group 1 ($p < 0.01$ for all three comparisons). Rates of HPV positivity were highest in the Haitian community 25 % versus 10 % and 13 % in the other two locations ($p < 0.05$). CHWs were able to confirm follow-up and treatment (when needed) in over 90 % women having an abnormal screen.

CONCLUSIONS: We found that among a sample of immigrant predominantly low income and uninsured women, HPV self sampling was considerably superior to health education and CHW navigation to achieve cervical cancer screening. Our findings lend strong support for this screening strategy among hard to reach minority populations.

A RANDOMIZED TRIAL OF SOCIAL NORMS FEEDBACK AND FINANCIAL INCENTIVES FOR PHYSICAL ACTIVITY USING A TEAM-BASED APPROACH Mitesh Patel^{1, 2}; Kevin G. Volpp^{1, 2}; Roy Rosin¹; Dylan Small¹; Scarlett Bellamy¹; Nancy Haff³; Samantha Lee¹; Lisa Wesby¹; Karen Hoffer¹; David Shuttlesworth¹; Devon Taylor¹; Victoria Ulrich¹; Jingsan Zhu¹; Lin Yang¹; Xingmei Wang¹; David A. Asch^{1, 2}. ¹University of Pennsylvania, New York, NY; ²Philadelphia VA Medical Center, Philadelphia, PA; ³Massachusetts General Hospital, Boston, MA. (Tracking ID #2196543)

BACKGROUND: More than half of adults in the United States do not achieve the minimum recommended level of physical activity to achieve health benefits. Social comparisons and incentives may provide potent new ways to increase engagement but the optimal type of feedback is unknown. Insights from behavioral economics may offer new strategies to frame feedback and design incentives to change behavior. The objective of this study was to evaluate the effectiveness of using social norms feedback and financial incentives for physical activity using a team-based approach.

METHODS: Two hundred eighty-eight employees from a large corporation in Philadelphia formed 72 four-member teams randomized to 4 arms: 50th percentile feedback (weekly feedback compared to other teams in the same arm), 75th percentile feedback, 50th percentile feedback with incentives, 75th percentile feedback with incentives—with

reward eligibility based on achieving at least 7000 steps per day, a level endorsed by the American College of Sports Medicine as meeting federal guidelines for the minimum level of physical activity to achieve health benefits. Financial incentives with a daily expected value of \$1.40 were offered during the 13 week intervention period using a weekly regret lottery in which participants had an 18 % chance to win \$35 and a 1 % chance to win \$350. Social norms feedback on performance relative to other teams was delivered weekly for all 26 weeks. Step counts were tracked by smartphone accelerometers using an application that ran passively in the background. The primary outcome measure was the proportion of participant-days that the goal was achieved during the intervention. The intent-to-treat analysis used generalized linear and mixed-models to adjust for the repeated measures of participant step counts and clustering by team. All hypothesis tests were two-sided. To maintain the type I error rate while testing 3 pairwise comparisons, we used a Bonferroni correction to define an alpha of 0.0167 as our threshold for statistical significance. We estimated that a sample of at least 280 participants would ensure 80 % power to detect a 20 % difference between arms.

RESULTS: Participants in the study sample had a mean body mass index of 28.4 (standard deviation [SD]: 6.5), mean age of 41.3 (SD 12.0), and were 80.1 % female. During the intervention period, the 50th percentile framing with incentives had the greatest proportion achieving the goal and was significantly more effective than feedback compared to the 75th percentile without incentives (0.45 vs. 0.27, Difference: 0.18, 95 % confidence interval [CI]: 0.04–0.32, $P=0.012$). Compared to the 75th percentile without incentives, there were no significant differences for 75th percentile with incentives (0.38 vs. 0.27, Difference: 0.11, 95 % CI: –0.05–0.27, $P=0.19$) or the 50th percentile without incentives (0.30 vs. 0.27, Difference: 0.03, 95 % CI: –0.10–0.16, $P=0.67$). The 50th percentile with incentives arm had the greatest level of daily steps during the intervention period but it was not significantly different than the 75th percentile without incentives arm (Difference: 1078, 95 % CI: –71–2188, $P=0.07$). There were no significant differences between arms during the follow-up period.

CONCLUSIONS: A team-based approach was effective for increasing physical activity when framing team performance relative to the 50th percentile and using financial incentives. These findings highlight that the design of performance feedback has a significant impact on engagement levels.

A SECOND LOOK AT POST-INTERVIEW COMMUNICATION Jonah Feldman^{1,2}; Eugene Medvedev¹; Jamie Yedowitz-Freeman¹; Stanislaw Klek¹; Nicholas Berbari¹; Shirley Hanna¹; Mark Corapi¹. ¹Winthrop University Hospital, Mineola, NY; ²Stony Brook University School of Medicine, Stony Brook, NY. (Tracking ID #2197567)

BACKGROUND: In response to concerns about the variability of and challenges with post-interview communications between applicants and programs, an APDIM task force was convened to establish guidelines for communications during the NRMP match. The recommendations proposed by the task force include a provision that programs should advise applicants that second looks are “neither required nor encouraged”, but there exists no previously published studies that inform on this specific guidance. The aim of this study was to evaluate applicants’ attitudes toward a Formal Second Visit (FSV) at a large Internal Medicine Residency Program.

METHODS: An anonymous, four-question survey was distributed online to applicants following their FSV at a 600 bed University Hospital. Responses were collected prior to the 2014 Match Day and reflected both multiple choice and free-text answers. Characteristics of the FSV at this institution include: a formal invitation sent to the residency program’s top candidates, a prescheduled experience with the medical floor teams, planned participation in two of the program’s daily didactic sessions, individual meetings scheduled with the Program Directors, and a dinner with the Department Chair.

RESULTS: The survey response rate was 62.3 % (33/53). Among respondents, 97 % reported being happy they spent the time to take a second visit to the program, and 59.3 % felt their opinion changed in a positive way because of new information about the program learned during the FSV. When asked whether they felt pressured to attend an FSV once offered, the majority of respondent (75.8 %) said “no”. Similarly, when asked whether a policy advocating for the discontinuation of second visits would benefit Internal Medicine applicants, the majority (71.9 %) of respondents stated “no”.

CONCLUSIONS: Previous studies have reported that post-interview communication was stressful for applicants and, in some cases, undermined the integrity and spirit of the match. These studies focus on email or phone contact with applicants after interview day. There have been no previous studies evaluating second look visits in general, or FSVs in particular, at an internal medicine residency program. Second visits are different from other forms of post-interview communication as there is an opportunity for applicants to experience residency programs in a more intimate way than that which would be afforded to them on interview day. Our single center study found that FSVs as a particular form of post-interview contact was overwhelmingly supported by participants, though a significant minority felt pressure to attend the second visit once invited. Further research is

needed to determine the optimal way to offer applicants the option of a second visit without contributing to the overall stress of the application process.

A SMARTPHONE-BASED ONLINE SUPPORT GROUP FOR PEOPLE LIVING WITH HIV Tabor E. Flickinger²; Claire DeBolt²; Erin Wispelwey³; Colleen Laurence⁴; Erin Plews-Ogan²; Ava Lena Waldman²; George Reynolds⁵; Wendy F. Cohn²; Mary Catherine Beach¹; Karen Ingersoll²; Rebecca Dillingham². ¹Johns Hopkins University, Baltimore, MD; ²University of Virginia, Charlottesville, VA; ³University of London, London, United Kingdom; ⁴Wake Forest School of Medicine, Winston Salem, NC; ⁵Health Decision Technologies, Oakland, CA. (Tracking ID #2198786)

BACKGROUND: Although there is growing interest in mobile applications and online support groups (OSGs) to enhance chronic disease self-management, little is known about the potential impact of these tools for people living with HIV (PLWH). Our study analyzes an innovative OSG delivered through a community message board (CMB) within a clinic-affiliated Smartphone application (Positive Links, PL). Our objectives were to 1) compare characteristics of posters and non-posters to the CMB and 2) evaluate content posted to the CMB.

METHODS: For this pilot study, 38 HIV-infected patients were recruited through provider referrals at a university-based clinic and from area AIDS service organizations (ASOs) and HIV testing sites. Participants received cell phones with the PL application that included the opportunity to interact with other users on a CMB. Logistic regressions investigated associations between participant characteristics and posting on the CMB. CMB messages were downloaded and analyzed qualitatively by two independent coders using a Grounded Theory approach.

RESULTS: Mean age was 34.1 years (SD 11.5) and the majority of participants were male (74 %). Seventeen participants identified as black, non-Hispanic (45 %), and 13 as white, non-Hispanic (34 %). Sixty-one percent of participants were unemployed; 37 % had public insurance (such as Medicare or Medicaid) and 32 % had no insurance; and 45 % were below 100 % of the federal poverty level. Twenty-four participants posted to the CMB; 14 did not. Participants had lower odds of posting if they were white [OR 0.20 (0.05–0.84), $p=0.028$] and had private insurance [OR 0.07 (0.01–0.41), $p=0.003$]. Participants had higher odds of posting if they had unsuppressed viral loads [OR 5.13 (1.13–23.30), $p=0.034$]. In multivariable analyses, having private insurance remained the strongest association with not posting on the CMB [OR 0.09 (0.01–0.71), $p=0.023$]. Of the 840 CMB messages over 8 months, 62 % had psychosocial content, followed by community chat (29 %), and biomedical content (10 %). Of psychosocial content, posts frequently described stressors (including relationships outside the CMB, disclosure, stigma, and both geographic and social isolation) and discussed coping strategies. Of community chat content, greetings were most common and included messages welcoming new members, greetings to individual users and greetings to the entire group. Of biomedical content, most posts discussed medications, followed by seeing a healthcare provider and laboratory results. Posts on medications were centered on the importance of adherence and support for others having difficulty.

CONCLUSIONS: The dominance of psychosocial over biomedical content may be unique to this CMB, in contrast to other studies identifying informational support as the primary content on online forums for chronic illness. Participants who posted on the CMB expressed support for each other, appreciation for the community, and a perception that the app played a positive role in their struggles with HIV. This CMB on a clinic-affiliated mobile app may reach vulnerable populations, including racial/ethnic minorities and those of lower socio-economic status, and potentially provide psychosocial support to PLWH. Further development of this app and CMB will include investigation of possible benefits in improving social support, linkage and retention in HIV care, and health outcomes for PLWH.

A STATISTICAL MODEL FOR PREDICTING NEUTROPENIC FEVER Ariel Nelson; Dan Eastwood; Tao Wang; Karen Carlson; Laura Michaelis; Marcelo Pasquini; Parameswaran Hari; Christopher Chitambar; Timothy Fenske; Mary Beth Graham; Mehdi Hamadani; Anita D’Souza; Ehab Atallah. Medical College of Wisconsin, Milwaukee, WI. (Tracking ID #2191299)

BACKGROUND: Febrile neutropenia (FN) is a common occurrence associated with chemotherapy regimens used in patients with acute myelogenous leukemia (AML). Febrile neutropenia is presently defined as a single temperature of $\geq 38.3^{\circ}\text{C}$ (101°F) or a temperature of $\geq 38.0^{\circ}\text{C}$ (100.4°F) for >1 h in a patient with an absolute neutrophil count $<500/\text{mm}^3$. Due to the potential for life threatening infections, fever in a patient with neutropenia is considered an oncologic emergency. Initiating appropriate antibiotic therapy as soon as possible in these patients leads to better outcomes. However, to our knowledge, there is no evidence that supports the current definition of neutropenic fever. The goal of this pilot study was to analyze patient fever data and utilizing statistical analyses, develop a prediction model which would predict febrile neutropenia.

METHODS: After obtaining IRB approval we retrospectively obtained demographic and temperature data from hospitalized patients with AML undergoing chemotherapy who were admitted to our institution between 12/8/2012 and 12/7/2013. Temperature data was recorded at intervals per physician order and nursing discretion during admission. We identified fever as a single temperature $\geq 38.3^\circ\text{C}$ (101°F) or consecutive temperatures recorded 1 h apart $\geq 38.06^\circ\text{C}$ (100.5°F). Data was obtained for 68 patients containing 137 fever events. Plots were created showing temperature over time leading up to a fever event. Our data consists of unequal interval time series data and does not lend itself to the usual methods of statistical ROC analysis. The data was simplified to perform an ROC-like analysis to estimate sensitivity and specificity of decision rules that predict oncoming episodes of FN. Statistics on each patient series were used as variables in predicting fever onset in logistic regression analysis. The variables included were maximum temperature within 24 h, minimum temperature within 24 h, average of positive increases between subsequent measurements, and largest 24 h increase. Statistical analysis consisted of a generalized linear model with logit link (logistic regression) predicting fever at least 4 h before onset, and used generalized estimating equations to adjust for correlated temperature measures within patient.

RESULTS: Of the 68 patients identified, 47 % were male, 53 % were female with a mean age of 56.3 ± 15.1 years. Our fever curve plots suggest that there is an increase in average temperature at least 24 h before the onset of fever in those patients that will go on to develop a fever by current definition (Figure 1). Significant identified predictors of fever included; maximum and minimum temperature within 24 h, and the average of positive increases in temperature between subsequent measurements. A prediction score including, maximum temperature within 24 h, minimum temperature within 24 h, average of positive increases between subsequent measurements, and largest 24 h increase was able to predict 86.1 % of oncoming FN events 4 to 28 h before onset and reject 67.4 % of non-FN events. This rule has a negative predictive value of 96.2 % and a positive predictive value of 33.7 %.

CONCLUSIONS: Our analysis demonstrates the feasibility of using temperature series data for early prediction of FN. A more comprehensive analysis is planned and is expected to result in higher sensitivities. If subsequent analysis proves to be significant this data may be used to develop future prospective clinical studies to evaluate new fever criteria and may alter our current definition and management of patients with FN.

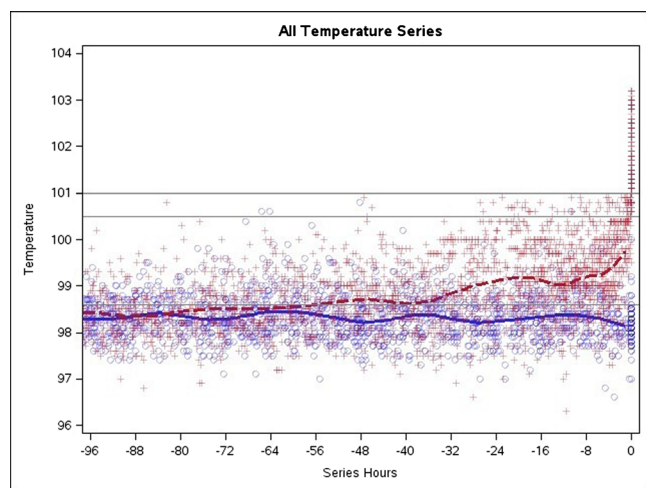


Figure 1. Fever curve plot of 96 h of temperature series data preceding the onset of fever or end of series if no fever. The dark lines are LOESS smoothed average temperatures for series ending in fever (dash) or non-fever (solid).

A STUDY OF THE LOCATION OF RESEARCH FUNDING DISCLOSURE IN HIGH IMPACT SCIENTIFIC JOURNALS ¹Jonah Feldman^{1, 2}; Christopher Garcia¹; gary carpenter¹; Brahmhatt Saloni¹. ¹Winthrop University Hospital, Mineola, NY; ²Stony Brook School of Medicine, Stony Brook, NY. (Tracking ID #2199149)

BACKGROUND: Recently published reports have demonstrated that disclosure of industry sponsorship negatively influences physicians' perception of the methodological quality of a study. Though there is consensus on the importance of sponsorship disclosure, and a growing understanding of the effect of disclosure on readership, the actual disclosure

practices of leading scientific journals have not been well characterized. The purpose of our study is to evaluate funding disclosure practices in top scientific journals, specifically focusing on the location of funding disclosure within the journal article.

METHODS: We reviewed the 221 scientific journals with an impact factor equal to or greater than 6, as categorized by the Thomas Reuters Journal Citation Report. The location of financial disclosure was determined by direct examination of print or online copies of a 2013 dated volume of the journal. Journals were categorized as having disclosures at the end of the article, at the end of the abstract, or no disclosure at all. The primary outcome was the percentage of journals with disclosures in each of these three categories.

RESULTS: It was found that 9 of 221 journals did not list disclosures (4.12 %). One hundred seventy-six of 221 journals (80.73 %) listed financial disclosures at the end of the article, and 33 of 221 journals listed financial disclosures in the abstract (15.13 %).

CONCLUSIONS: In this cross sectional study we show that the great majority of top scientific journals practice disclosure of funding sources, but there is heterogeneity among these journals with regards to disclosure location. The majority of journals listed funding disclosures at the end of the article, while a small but significant minority listed funding within the abstract. This finding is important as studies of medical journal readership have shown that almost half the time readers will scan an abstract and skip the rest of the paper. If sponsorship disclosure is placed at the end of the paper the impact of these disclosures may be blunted. Our findings raise important ethical questions about appropriate sponsorship disclosure practices, and open up many avenues for further research and discussion.

A TALE OF TWO CONSTITUENCIES: PATIENT AND CLINICIAN ENGAGEMENT IN RESEARCH Crispin N. Goytia¹; Donna Shelley²; Rainu Kaushal³; Isaac Kastenbaum⁴; Carol R. Horowitz¹. ¹Mount Sinai School of Medicine, New York, NY; ²NYU School of Medicine, New York, NY; ³Weill Cornell Medical College, New York, NY; ⁴New York Presbyterian, New York, NY. (Tracking ID #2198586)

BACKGROUND: Patients and front-line clinicians are not adequately engaged in key aspects of research, including idea generation, recruitment and dissemination. An increasing focus on and funding for patient-centered research has uncovered gaps in our understanding of how patients and clinicians should be involved in the research enterprise. The NYC Clinical Data Research Network aims to create a large electronic data infrastructure for conducting patient-centered, clinical outcomes research. As part of this process, we explored patient, advocate, and clinician experiences with research, how they would like to be involved, recruitment challenges and suggestions, and study ideas.

METHODS: A team of researchers, patients, clinicians, and privacy and technology experts developed a question guide. We identified pre-existing patient, community and clinician groups that meet regularly throughout NYC hospitals and neighborhoods, and asked to speak with them at one of their meetings for 15 min. A facilitator and note-taker met with 20 such groups (11 clinician; 9 patient/community). The research team analyzed meeting notes to identify themes of discussions and compare results of patient and clinician groups.

RESULTS: Fully 272 individuals participated in these listening sessions (49 % generalist and specialist clinicians, 51 % patients/families/advocates). Most (67 %) were non-white (90 % of patients and 44 % of clinicians). Few had personally participated in research (34 % of patients; 0 % of clinicians), but most were interested in future involvement as participants or collaborators. Patients and clinicians shared most themes: 1) To improve research-related recruitment, perceptions, awareness and interest, there should be "warm handoffs" from clinicians to patients, and accessibility to general research and specific study information through community education campaigns and patient and clinician-friendly portals; 2) Both wanted training to translate their thoughts and concerns into concrete research questions; 3) They were most interested in studies comparing outcomes of interest between practices and between neighborhoods; and 4) Concerns included the potential for data inaccuracy, and research findings not being shared with them and their geographic or clinical communities. Clinicians expressed concerns about research recruitment taking time and disrupting workflow, and study findings contradicting clinical recommendations they provide. Finally, patients' negative attitudes toward clinical care readily translated into negative attitudes toward research at sites of care, and they were worried that data could never be truly de-identified and that research to date has not had enough impact.

CONCLUSIONS: While 15 min discussions only opened small windows to explore patient and clinician-centered research involvement, they afforded an opportunity to learn from diverse groups who can be difficult to engage in such efforts. These stakeholder groups shared many hopes, ideas and concerns about research, including strong interest in expanding their research literacy, social marketing to bolster research interest, and learning how to transform their experiences into study questions or outcomes of interest. Concerns about data inaccuracies, maintaining privacy, and failures in receiving past study findings and enjoying tangible research benefits dampened enthusiasm for participation. These

findings may assist research teams in identifying areas for further research and building engagement and recruitment strategies.

ABERRANT BEHAVIOR IN CHRONIC NON-CANCER PAIN PATIENTS PRESCRIBED SCHEDULE II NARCOTICS Mohamed Rezik; Alex Garbarino; Grace Choe; Sheetal Patel; Sam Tingari; Joshua Collins. Henry Ford Hospital, Dearborn, MI. (Tracking ID #2191810)

BACKGROUND: An estimated 100 million US patients suffer from chronic pain, a condition that is now largely treated with narcotics. The availability of these drugs has led to an increase in their adverse effects, misuse and abuse. This, in turn, has led to various attempts to reduce the potential for aberrant behavior including the use of patient-provider agreements. In an effort to reduce aberrant behavior in an urban academic primary care clinic, patient-provider agreements were instituted as part of a larger policy to monitor patients being treated for chronic non-cancer pain with schedule II narcotics. The primary aim of this study was to determine the rate of aberrant behavior in patients receiving schedule II narcotics 1 year after the implementation of this chronic pain policy.

METHODS: This was a retrospective cohort study involving manual electronic medical record (EMR) and Michigan Automated Prescription Review (MAPS) review of 952 patients. The inclusion criteria were adult patients with active chronic prescription for a schedule II narcotic with either two or more clinic visits from January 2014 through August 2014 or with faculty physicians listed as primary care physician in the EMR. Aberrant behavior was defined as: MAPS revealing early refills or prescriptions from a non-clinic provider and urine toxicology (UTox) results with illicit or unprescribed substances or absence of prescribed opiates. The primary outcome was the rate of aberrant behavior.

RESULTS: Two hundred seven patients were included in the study after full manual review. One hundred five patients (51 %) met the definition of aberrant behavior with 47 patients having early refills (45 %), 44 with multiple prescribers (42 %), and 54 with unexpected urine toxicology results (51 %). Secondary analyses revealed that predictors of identifying aberrant behavior included: missed pain visit in the prior year (1.4 vs. 0.8, $p=0.03$) and a UTox being performed within the last 1 year (86 % vs. 68 %, $p=0.002$).

CONCLUSIONS: The rate of aberrant behavior identified in our study was higher than similar studies. However, the definition of aberrant behavior varies widely in the existing literature. The most common aberrant behavior identified was an unexpected UTox result. Semi-synthetic opioids, even when taken as prescribed, often show up negative on UTox and require a confirmatory test. This was not a common practice in this clinic prior to our study. Furthermore, the accepted (and legal in Michigan) use of marijuana for analgesic purposes is inconsistent among providers in the clinic. When removing these patients whose only aberrant behavior was testing negative for opiates or positive for marijuana, the rate of aberrant behavior fell to 37 %. This figure is more in line with previous literature. An interesting observation was that patients with aberrant behavior were more likely to have missed a pain visit, either by cancelling or not showing. The only significant predictor of aberrant behavior was an obtained UTox, which can be presumed to be ascertainment bias. Implications of this study include changes to the formal clinic policy to encourage providers to follow up unexpected UTox results, particularly an unexpected negative test for prescribed opiates. Further secondary outcomes have informed internal quality improvement initiatives to optimize patient care and management of patients treated for chronic non-cancer pain with opiates.

ACCEPTED WISDOM: NOT NECESSARILY CORRECT. Julian M. Rios²; Thomas Higgins²; Orlando L. Torres¹. ¹Baystate Health, Springfield, MA, MA; ²Baystate Medical Center, Springfield, MA. (Tracking ID #2198850)

BACKGROUND: Hispanics and non-English proficient patients have a lower rate of CRC screening at the national level. This is concerning, because colorectal cancer (CRC) is the second leading cause of cancer death, and the third most common cancer found in men and women. Screening has a potentially significant impact on preventing mortality and morbidity with up to 60 % of deaths from CRC prevented if appropriate screening was done regularly and findings treated appropriately. According to the CDC, the overall rate of CRC screening is 58.6 % in the general population, but it is only 46.5 % in Hispanics, indicating significant disparities in the delivery of care. Lower cancer screening rates have been associated with less education and non-English speaking status. The objective of this study is to determine if non-English proficient Hispanics adults, primarily Spanish speaking, are less likely to undergo CRC screening.

METHODS: Baystate High Street health Center-Adult Medicine (BHSCH-A) is an urban, academic, patient centered medical home practice serving a primarily Puerto Rican population (51.8 %). A large proportion of the patient population self-identified as Spanish speaking (23.9 %). We used BHSCH-A Preventive Health Registry in October 2014 to identify Spanish speaking adults ages 50 to 75 years who were overdue for CRC screening. We then performed a chart review to verify their actual CRC screening status. Each chart was checked for evidence of CRC screening, either by endoscopy or by fecal

occult blood testing (FOBT) by looking at the procedure notes, outside hospital records scanned, and laboratory results from October 2004 to October 2014.

RESULTS: Of 9294 individuals in the registry, we identified 3296 between the ages of 50 to 75 years; of these, 1038 reported Spanish as their primary spoken language. Of these, 60 % were female, and 40 % male. The percentage of men who had had up-to-date CRC screening was 74.4 %, while the percent of women with up-to-date CRC screening was 76.6 %. In average 75.7 % of the Spanish-speaking population ages 50 to 75 years at BHSCH-A were current on their CRC screening.

CONCLUSIONS: At a single health center, more than 75 % of eligible non-English proficient Hispanics were found to be current on their CRC screening, which is above the Healthy People 2020 target of 70.5 % set by the Department of Health and Human Services. This demonstrates that National HEDIS Top 10 percentile CRC screening rates can be achieved despite serving a socioeconomically disadvantaged population that is primarily Hispanic and non-English proficient.

ACCOMMODATIONS FOR MEDICAL STUDENTS WITH DISABILITIES: EXPLORING U.S. MEDICAL SCHOOLS' TECHNICAL STANDARDS. Christopher Moreland¹; Philip Zazove²; Benjamin Case²; Missy Plegue²; Anne Hoekstra²; Alicia Oulette³; Ananda Sen²; Michael Fettes². ¹The University of Texas HSC - San Antonio, San Antonio, TX; ²University of Michigan, Ann Arbor, MI; ³Albany School of Law, Albany, NY. (Tracking ID #2191968)

BACKGROUND: Medical education literature increasingly supports correlations between diverse medical professionals, including physicians with disabilities, and higher quality care for underserved populations. However, about 20 % of the general population has a disability, while only about 1 % of medical students do. Moreover, the Americans with Disabilities Act (ADA) requires medical schools to provide reasonable accommodations to learners with disabilities. Medical schools, per accrediting organizations, have enacted technical standards (TS) that vary in scope, requirement, and compliance with ADA spirit. Despite recent case law, some schools have refused to provide accommodations. We sought to examine U.S. medical schools' TS to assess apparent willingness to comply with and factors that predict compliance with federal antidiscrimination laws, including the ADA.

METHODS: From 2012 to 2014, we conducted a web-based search of existing websites (along with follow-up to schools without posted information) of 138 MD-granting medical schools (as listed by the Association of American Medical Colleges) to identify required TS for medical students, focusing on hearing, visual, and mobility disabilities. Two authors iteratively coded each school's TS for the themes below; disagreements were resolved by consensus or, if none was reached, further review with 2 other authors. Themes, studied included the willingness of medical schools to provide reasonable accommodations, locus of responsibility for accommodations, and acceptability of intermediaries or auxiliary aids for students with disabilities. The process was later repeated for DO-granting schools.

RESULTS: One hundred sixteen (84.1 %) of 138 schools made technical standards available on their websites, of which 84 (59.4 %) were easily accessible; 9 of the remaining schools provided the standards upon direct request. Forty (29.0 %) schools had technical standards supportive of providing reasonable accommodations as required by the ADA to students with at least 1 of the 3 disabilities listed above; sixty (43.5 %) schools did not, 6 (4.3 %) were equivocal, and 32 (23.2 %) were unclear. Most schools provided no information on the locus of responsibility for providing accommodations, although 1 school placed it solely on the student and 8 (5.8 %) had joint responsibility between the school and student. Only 35 % allowed the use of auxiliary aids by students with hearing, visual, or mobility disabilities, and less than 10 % of all schools allowed the use of intermediaries such as a sign language interpreter.

CONCLUSIONS: Medical schools often do not provide easy online access to TS; some did not provide TS despite direct requests. Both create barriers for potential applicants with disabilities. Most TS are at best equivocal when it comes to reasonable accommodations; <35 % are openly supportive, while some overtly restrict accommodations. Few openly allow intermediaries. Further research should explore actual experiences with accommodations from the school, learner, and faculty perspectives. Medical schools and administrative organizations should reevaluate and modernize technical standards in light of the legal landscape, particularly the ADA.

ACQUISITION OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG REFUGEES AND IMMIGRANTS: A LONGITUDINAL STUDY Gabriel E. Fabreau^{2,4}; Seth A. Berkowitz³; Wei He³; Chantal Kayitesi¹; Sarah Oo¹; Steven J. Atlas³; Sanja Percac-Lima³. ¹Massachusetts General Hospital, Chelsea, MA; ²University of Calgary, Calgary, AB, Canada; ³Massachusetts General Hospital, Boston, MA; ⁴Brigham and Women's Hospital, Boston, MA. (Tracking ID #2196070)

BACKGROUND: Acquisition of cardiovascular disease risk factors such as obesity, hypertension and hyperlipidemia among refugees and immigrants living in the same community as American-born patients may differ partly due to acclimating into a new

culture. Understanding risk factor differences between these populations has important implications for implementing cardiovascular disease prevention programs for refugee and immigrant populations.

METHODS: We conducted a longitudinal cohort study of adult refugee patients ≥ 18 years old entering the US between 2004 and 2013. We matched these patients by age, sex and date of initiation of care in a 1:3 ratio to 1) Spanish speaking non-refugee immigrants and 2) English speaking US-born controls. The cohort was limited to primary care patients within the same community health center, a state designated refugee clinic, located in a low-income, culturally diverse community in Eastern Massachusetts. Electronic medical record data were used to follow patients longitudinally for the acquisition of obesity (body mass index [BMI] >30 kg/m²), hypertension and hyperlipidemia using validated algorithms. Additionally, we collected information on age at cohort entry, sex, baseline BMI, education (< vs. high school diploma vs. any post-secondary), insurance type, and, to account for neighborhood differences, census tract level median household income. We used multivariable Cox regression to estimate the risk of acquiring obesity, hypertension and hyperlipidemia for refugees and immigrants compared with English-speaking controls. We excluded patients with risk factors at baseline from the risk factor acquisition analyses.

RESULTS: A total of 3174 patients were included in our analysis. Mean (SD) age at cohort entry was 34.6 (12.3) years, and 51.7 % (1642/3174) were female. Among refugees, the most common countries of origin were Somalia (17.8 %), Iraq (16.7 %) and Bhutan (8.8 %). At baseline, 14.6 % (88/604) of refugees, 15.3 % (200/1310) of immigrants and 12.4 % (156/1260) of controls ($p=0.09$) were obese, and the prevalence of hypertension was similar: 9.1 % (55/604) of refugees, 9.7 % (127/1310) of immigrants, and 8.6 % (108/1260) of controls ($p=0.61$). Baseline hyperlipidemia was less common in

refugees: 2.5 % (15/604) of refugees compared with 6.0 % (79/1310) of immigrants and 6.8 % (85/1260) of control patients ($p<0.01$). Median follow-up time was 3.7 years [IQR, 1.3–7.4] during which 21.1 %, 8.0 %, and 11 % of refugees, 32.8 %, 10.1 %, and 20 % of immigrants and 31.3 %, 11.6 %, and 15.1 % of controls developed obesity, hypertension and hyperlipidemia respectively. In unadjusted Cox regression models, immigrant patients had higher risks of acquiring obesity (HR 1.21, 95 % CI 1.04–1.40) and hyperlipidemia (HR 1.52, 95 % CI 1.25–1.84) compared to controls. In contrast, refugee patients had no increased unadjusted risks of acquiring any risk factor compared to controls. In Cox models adjusting for the aforementioned covariates, both refugee and immigrant statuses were associated with an increased risk of obesity compared with English-speaking controls (Table 1). Immigrant status alone was associated with an increased risk for hyperlipidemia compared to controls (Table 1), and additionally when compared to refugees (HR 1.46, 95 % CI 1.01–1.98). There were no other significant differences in risk factor acquisition between refugees and immigrants in the adjusted analyses.

CONCLUSIONS: The acquisition of cardiovascular risk factors was observed in all study cohorts during follow-up. In particular, refugee and immigrant patients were at increased risk of becoming obese and immigrants were at increased risk of developing hyperlipidemia compared with both age and gender matched controls and refugees in the same community. These risk factors developed over a relatively short time span in a cohort of young patients and have significant implications for long-term health. Targeted and culturally tailored education and lifestyle interventions early after arrival of refugee and immigrant patients may mitigate the acquisition of these cardiovascular risk factors.

Frequencies of and Risk of developing obesity, hypertension and hyperlipidemia among refugee and immigrant patients compared with English-speaking controls

Risk Factor	Patient Group	Risk Factor Frequency at Baseline (%)	Risk Factor Frequency at Follow up (%)	Adjusted Hazard Ratio* [95 % CI]
Obesity	Refugees	14.6	32.6	1.33 [1.04–1.72]
	Immigrants	15.3	43.1	1.22 [1.01–1.46]
	Controls	12.4	39.9	–
Hypertension	Refugees	9.1	16.4	0.97 [0.65–1.45]
	Immigrants	9.7	18.8	0.96 [0.70–1.31]
	Controls	8.0	19.2	–
Hyperlipidemia	Refugees	2.5	13.2	1.00 [0.72–1.39]
	Immigrants	6.0	24.9	1.46 [1.13–1.88]
	Controls	6.8	20.9	–

*model adjusted for age at entry, gender, baseline BMI, education, insurance and median household income.

ADDRESSING A GROWING NEED FOR LANGUAGE SERVICES: HOW WELL ARE WE DOING? Alissa Detz¹, Julie Brown², Mark Hanson², Karin Liu², Mary Slaughter³, Robert Weech-Maldonado⁴, Neil Wenger^{1, 2}, David Ganz^{2, 1}. ¹University of California, Los Angeles, Los Angeles, CA; ²RAND Corporation, Santa Monica, CA; ³RAND Corporation, Pittsburgh, PA; ⁴University of Alabama, Birmingham, AL. (Tracking ID #2198047)

BACKGROUND: Approximately 9 % of individuals in the U.S. have limited English proficiency (LEP), defined as speaking English less than “very well” by self-report. Title VI of the Civil Rights Act requires agencies receiving federal funding to provide interpreters to individuals in need, and prior research indicates that providing professional interpreters for LEP patients improves satisfaction and health outcomes. Nonetheless, previous studies suggest that access to interpreters is low across many healthcare settings. Because patient perception of access to interpreters and unmet need has not been fully explored, we pilot tested a set of survey items to evaluate patient perception of language services among Spanish-speaking LEP individuals.

METHODS: We modified existing Consumer Assessment of Healthcare Providers and Systems (CAHPS) items from the Cultural Competence Item Set based on cognitive interviews with older Spanish-speaking persons. These items were then embedded in a CAHPS survey conducted for the purpose of pilot testing new items. To optimize Spanish survey responses, 6 Medicare Advantage plans in Florida and California were identified for pilot testing due to having 30 % or more survey responses in Spanish during prior CAHPS surveys. Individuals were included in this study if they were 18 years or older and had been enrolled in these selected Medicare Advantage health plans for 6 months continuously prior to survey administration. Individuals known to be institutionalized were excluded. Surveys were administered by mail, with telephone administration as the secondary or non-response mode. Our analysis focused on individuals who completed the

survey in Spanish. First, we conducted descriptive analyses of responses to the survey items addressing interpreter services. Second, we determined if individual or geographic level variables could predict the need for an interpreter using bivariate analysis and logistic regression. Third, we performed bivariate analysis followed by exploratory linear regression to determine the association between needing an interpreter and validated CAHPS measures regarding communication and overall ratings of physician, specialists, health plan, and healthcare, as well as a survey item regarding physician sensitivity to beliefs.

RESULTS: Total survey response rate was 40 %. The 991 individuals who completed the survey items regarding interpreters were primarily female (58 %), had less than a college education (81 %), and 93 % were 65 years or older. Fourteen percent ($N=134$) of the 991 individuals completing the Spanish version of the survey reported needing a medical interpreter. Within this group, 47 (37 %) reported not being informed of their right to free interpreter services and 30 (23 %) reported an encounter when they needed an interpreter but were unable to get one. Among individuals reporting a need for an interpreter, 72 (56 %) always used an interpreter provided by the doctor’s office and 42 (33 %) used a family member or friends to interpret at least sometimes. Younger age and lower education were individual level predictors of the need for an interpreter. Multivariate models that also included state and health plan-related variables suggested that membership in a Medicare Advantage special needs plan (SNP) and state of residency were also important predictors. Individuals not in a SNP had a relative risk of needing an interpreter of 2.01 (95 % CI 1.04–3.89) compared to individuals enrolled in a SNP. Individuals from California had a relative risk for needing an interpreter of 6.34 (95 % CI 4.13–9.73) compared to those in Florida. Individuals who needed an interpreter rated their personal physician more poorly and were less likely to feel that their physician valued their beliefs.

CONCLUSIONS: A relatively small proportion of respondents needed an interpreter, but many of these individuals were unaware of their right to medical interpreters and had difficulty accessing interpreters when needed. Those needing interpreters had lower ratings of their personal physician. Our data support the importance of measuring access to interpreter services. Patients should be better informed about their right to interpreters, and health systems should devise targeted interventions to ensure timely access to interpreters for all patients with language barriers.

ADDRESSING BASIC RESOURCE NEEDS IN PRIMARY CARE IMPROVES BLOOD PRESSURE AND CHOLESTEROL CONTROL: A PRAGMATIC INTERVENTION

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BACKGROUND: Unmet basic resource needs, such as difficulty affording food, housing, or medications, are associated with poor health. However, it is unclear if helping patients meet those needs improves clinical outcomes.

METHODS: We conducted a pragmatic evaluation of the HealthLeads program in two academic primary care practices in Eastern Massachusetts, using data from October 1, 2012 (1 year prior to the program's start on October 1, 2013) through October 1, 2014. HealthLeads (HL) uses trained 'advocates' to screen patients at visit check-in for healthcare, employment, financial, food, transportation, utilities, housing, or legal needs, and then connect patients to community resources to meet those needs. Data on systolic and diastolic blood pressure (SBP and DBP), low-density lipoprotein cholesterol (LDL-C), and hemoglobin A1c (HbA1c), along with sociodemographic and clinical characteristics, were collected from electronic sources. We used chi-squared and t-tests to compare baseline demographic and clinical characteristics. We used unadjusted and multivariable difference-in-differences linear mixed modeling to compare changes in SBP and DBP (in those with hypertension), LDL-C (in those with increased cardiovascular event risk, including diabetes, hypertension, coronary heart disease, and hyperlipidemia), and HbA1c (in those with diabetes) between HL patients and those seen in the same practices, but who were not enrolled in HL. All patients also received usual clinical care.

RESULTS: Overall, 416 patients enrolled in HealthLeads and were compared with 2750 control patients. At baseline, HL patients were similar in age (mean age 56.3 vs. 54.9 years, $p=.13$), more likely to be women (51.9 % vs. 46.8 %, $p=.048$), be racial or ethnic minorities (24.7 and 18.4 % non-Hispanic black and Hispanic, respectively, vs. 16.4 and 11.2 %, $p<.001$), and have Medicaid (30.8 % vs. 20.0 %) or no insurance (9.2 % vs. 4.6 %), $p<.001$. HL patients most commonly reported difficulty affording healthcare and medications (46.5 %), food (40.0 %), and utilities (36.3 %). Hypertension (54.3 % vs. 46.3 %, $p=.002$) and diabetes (32.7 % vs. 20.4 %, $p<.001$) were more common in HL patients, but mean baseline SBP (135.3 vs. 135.2 mm/Hg in HL vs. non-HL patients, $p=.96$), DBP (79.2 vs. 78.0 mm/Hg, $p=.19$), LDL-C (111.0 vs. 106.3 mg/dL, $p=.10$), and HbA1c (7.7 % vs. 7.5 %, $p=.39$) were similar. In unadjusted models, HL participation was associated with greater reductions in SBP (3.8 mm/Hg lower in HL participants, 95%Confidence Interval [95%CI] 1.7–5.8 mm/Hg lower), DBP (2.0 mm/Hg lower in HL participants, 95%CI 0.8–3.1 mm/Hg lower), and LDL-C (10.5 mg/dL lower in HL participants, 95%CI 3.4–17.3 mg/dL lower), but not HbA1c (0.1 % higher in HL participants, 95%CI 0.2 % lower to 0.3 % higher). In models adjusted for age, gender, race/ethnicity, education, primary language, insurance, and Charlson comorbidity score, HL participation remained associated with significantly greater improvements in SBP (3.0 mm/Hg lower in HL participants, 95%CI 1.0–5.1 mm/Hg lower), DBP (1.8 mm/Hg lower in HL participants, 95%CI 0.6–3.0 mm/Hg lower), and LDL-C (11.5 mg/dL lower in HL participants, 95%CI 4.6–18.4 mg/dL lower). In adjusted models, improvement was not greater for HbA1c (0.1 % higher in HL participants, 95%CI 0.2 % lower to 0.3 % higher).

CONCLUSIONS: Addressing unmet basic resource needs as part of primary care was associated with clinically meaningful improvements in blood pressure and LDL-C, but not HbA1c. Future research should clarify which elements of the program were effective, make programmatic modifications to improve HbA1c, and evaluate whether changes in blood pressure and LDL-C achieved by meeting basic resource needs are associated with fewer cardiovascular events.

ADDRESSING RACIAL DISPARITIES IN HOSPICE USE: RESULTS FROM AN EDUCATIONAL INITIATIVE FOR RELIGIOUS LEADERS IN BALTIMORE CITY, MARYLAND

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BACKGROUND: Hospice organizations provide comprehensive, compassionate, interdisciplinary care to dying patients and their loved ones, with the goal of helping patients achieve a dignified, pain-free death. Despite the fact that many public and private insurers pay for hospice care, there is a well-documented racial disparity in hospice use in the United States. In Baltimore City, Maryland, African American residents use hospice services at half the rate of white residents. Data suggest lack of knowledge about hospice is a barrier to hospice use. However, there is little published on evidence-based interventions to reduce hospice use disparities. Given this absence of data, our objective was to assess the feasibility, acceptability, and perceived efficacy of an educational seminar for religious leaders about hospice.

METHODS: Seminar planning was informed by the hospice use disparities literature and followed a previously described framework for health disparities research. Planning

occurred with extensive input from local stakeholders and religious leaders. Following the seminar in November 2013, a survey was sent to all participants who registered for the event online with a valid email address. Results were analyzed by frequency of common responses and broader thematic categories.

RESULTS: Approximately 325 community and religious leaders attended the seminar; 15 % (38/247) of eligible participants completed a substantive portion of the survey. Following the seminar, 85 % were more likely to recommend a family member enroll in hospice, 79 % felt better prepared to counsel families about end-of-life care, and 91 % would participate in a similar event in the future. Two important themes emerged: (1) there is a need and desire in Baltimore communities for information about hospice and (2) respondents planned to share what they learned with their communities (table 1).

CONCLUSIONS: This novel, evidence-based educational seminar provides an example of a feasible, acceptable, and likely effective hospice outreach intervention, and suggests that religious leaders are important members of African American communities to engage in efforts to reduce hospice use disparities.

Summary of themes and select respondent answers

Theme	Responses
There is a need and desire for information about hospice	<p>"The information shared was very informative and helpful. I felt empowered by just being in the same room with so many members of the faith community who shared my experiences. Thank you for the investment in our ministries. It was much needed."</p> <p>"[The] information is vital."</p> <p>"I WOULD LOVE TO PARTICIPATE in any similar event you may offer in the future to help me be informed with my ministry as a Missionary in my church."</p> <p>"I believe the more correct knowledge we have allows the community to utilize services that enhance a good quality of life even as that life takes a turn toward the end of life."</p> <p>"We need to know about this for our members."</p>
Respondents planned to share what they learned with their churches and communities	<p>"A lot of good information... that I can use in my practice."</p> <p>"I feel better able to address the issues with family members because of all that was shared."</p> <p>"I now feel more comfortable referring clients to hospice."</p> <p>"I feel more comfortable counseling families because I am more informed."</p> <p>I attended the seminar to learn "effective ways to impact end of life care in the community"</p> <p>I attended the seminar to learn "information on ways to help others and take that information back to my church."</p>

ADHERENCE TO DIABETES MEDICATION: A QUALITATIVE STUDY OF BARRIERS AND FACILITATORS AMONG URBAN, LOW INCOME MEXICAN-AMERICANS WITH TYPE 2 DIABETES

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BACKGROUND: Poor adherence to medication is an important barrier to metabolic control for Mexican-Americans with type 2 diabetes and contributes to adverse health outcomes in this population. Medication adherence is influenced by a complex interplay of different factors, including medication beliefs. The purpose of this study is to explore beliefs and perspectives on diabetes medications among urban, Mexican-Americans with type 2 diabetes in order to inform strategies to improve diabetes self-management.

METHODS: Face-to-face, in-depth interviews were conducted in Spanish with a sample of 27 individuals (25 Mexican-Americans and 2 Latinos of other origin) with type 2 diabetes as part of a church-based, randomized controlled trial for diabetes self-management in a low-income, Latino neighborhood of Chicago. Interviews were audio-recorded, transcribed verbatim and translated by bilingual staff. Systematic qualitative methods were used for analysis.

RESULTS: The sample included 5 males (19 %) and 22 females (81 %), the mean age was 57±11 years and the mean duration of diabetes was 8.8±7.5 years. 85 % of participants were on oral hypoglycemic medication and 30 % were on insulin therapy. Barriers to adherence were lack of knowledge and skills in managing medication, forgetfulness, social stressors, cost of medication and mental health problems. Furthermore, beliefs about harmfulness of medication, concerns with efficacy of medication and the perception that there is less need of medication when eating healthy and being physically active were present among many participants and emerged as important barriers to adherence. Family support emerged as the main facilitator to medication adherence.

CONCLUSIONS: Mexican-Americans with type 2 diabetes face multiple barriers to adherence, including lack of knowledge and skills to manage treatment and beliefs about harmfulness and lack of efficacy of medication. Healthcare providers need to assess and address patients' perspectives and beliefs in order to improve medication adherence.

ADHERENCE TO SAFETY GUIDELINES FOR PRESCRIBING OPIOIDS FOR CHRONIC NONCANCER PAIN IN AN ACADEMIC PRIMARY CARE CLINIC

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BACKGROUND: Several guidelines recommend dose limits and urine drug testing for patients prescribed opioids for chronic noncancer pain (CNC). Higher prescribed doses increase the risk of adverse effects, complications, and overdose. Drug testing appears to modestly decrease opioid misuse.

METHODS: To assess patient and provider characteristics associated with safer practices prior to implementation of quality improvement initiatives, we performed a retrospective cohort analysis of patients prescribed opioids for CNC at two academic primary care clinics. We evaluated odds of high dose and urine drug testing using multivariate logistic models. Covariates included age, sex, race/ethnicity, marital status, city of residence, language, insurance, provider level, substance use disorders, smoking, and mental or physical comorbidities.

RESULTS: Among 842 patients prescribed opioids for CNC (3.4 % of clinic population), 47 and 23 % were prescribed ≥50 and ≥180 mg morphine equivalents per day, respectively. Tables 1 shows adjusted odds ratio for each variable's association with high dose. Associations were robust to sensitivity analysis using a 180 mg threshold. Thirty-five percent completed urine drug testing in the last 2 years. Table 2 shows adjusted odds ratio for each variable's association with urine drug testing.

CONCLUSIONS: Patients managed by resident physicians were more likely to be treated in accordance with published guidelines, with lower doses of opioids for CNC and greater odds of urine drug testing. High doses were less common in some groups and more common in nonlocal patients. Urine drug testing was uncommon and unequal utilization may have reflected biases and unsupported assumptions about risk of opioid misuse.

Odds of daily dose>50 mg morphine equivalent

	Multivariate OR (95 % CI)	P-value
<i>Age (years)</i>		
<50	1.0 (Ref.)	
50 to <60	0.74 (0.49–1.12)	0.15
60 to <70	0.86 (0.56–1.32)	0.49
≥70	0.44 (0.26–0.74)	0.002
Female	0.68 (0.50–0.93)	0.02
Married	1.01 (0.72–1.43)	0.94
Non-San Francisco address	2.09 (1.52–2.89)	<0.001
Non-English speaking	0.71 (0.33–1.53)	0.38
Medi-Cal insurance	1.24 (0.88–1.75)	0.22
<i>Race/ethnicity</i>		
Non-Hispanic White	1.0 (Ref.)	
Black	0.97 (0.68–1.38)	0.87
Hispanic	0.53 (0.31–0.93)	0.03
Asian	0.33 (0.15–0.76)	0.008
Other/Mixed	0.80 (0.44–1.46)	0.47
Resident Physician Provider	0.66 (0.46–0.94)	0.02
<i>Charlson Comorbidity Index</i>		
0	1.0 (Ref.)	
1	1.31 (0.91–1.88)	0.14

(continued)

≥2	1.16 (0.81–1.68)	0.42
<i>Other Comorbidities</i>		
Alcohol use disorder (ever)	1.16 (0.58–2.32)	0.67
Tobacco use (ever)	0.88 (0.55–1.39)	0.57
Other substance use disorder	0.78 (0.42–1.46)	0.44
Common mental health disorders	1.33 (1.00–1.80)	0.05
Other mental health disorders	0.95 (0.60–1.50)	0.83
Hypertension	0.87 (0.63–1.21)	0.41
Obesity	1.01 (0.70–1.47)	0.81

Odds of urine drug testing in last 2 years

	Multivariate OR (95 % CI)	P-value*
<i>Morphine daily dose equivalent, mg/day</i>		
<50	1.0 (Ref.)	
50 to <180	3.11 (2.09–4.63)	<0.001
≥180	3.92 (2.59–5.96)	<0.001
<i>Age (years)</i>		
<50	1.0 (Ref.)	
50 to <60	1.22 (0.79–1.91)	0.37
60 to <70	0.85 (0.53–1.37)	0.51
≥70	0.60 (0.33–1.10)	0.10
Female	1.08 (0.76–1.54)	0.66
Married	0.95 (0.65–1.41)	0.81
Non-San Francisco address	0.64 (0.44–0.92)	0.02
Non-English speaking	0.89 (0.35–2.26)	0.80
Medicaid insurance	1.92 (1.32–2.78)	0.001
<i>Race/ethnicity</i>		
Non-Hispanic White	1.0 (Ref.)	
Black	1.79 (1.21–2.65)	0.003
Hispanic	0.98 (0.52–1.85)	0.95
Asian	0.49 (0.18–1.32)	0.16
Other/Mixed	0.73 (0.37–1.45)	0.45
Resident Physician Provider	3.52 (2.38–5.20)	<0.001
<i>Charlson Comorbidity Index</i>		
0	1.0 (Ref.)	
1	1.11 (0.75–1.65)	0.61
≥2	1.01 (0.67–1.53)	0.95
<i>Comorbidities</i>		
Alcohol use disorder (ever)	1.01 (0.46–2.22)	0.99
Tobacco use (ever)	1.43 (0.87–2.34)	0.16
Other substance use disorder	2.76 (1.40–5.42)	0.003
Common mental health disorders	1.09 (0.78–1.52)	0.61
Major mental health disorders	1.20 (0.74–1.99)	0.48
Hypertension	0.73 (0.50–1.06)	0.09
Obesity	0.65 (0.43–0.99)	0.05

ADVANCED FUNCTIONAL IMPAIRMENT IS ASSOCIATED WITH HIGHER POST-ACUTE COSTS OF CARE IN MEDICARE SENIORS

S. Ryan R. Greysen¹; Irena S. Cencer²; Ken Covinsky². ¹University of California, San Francisco, San Francisco, CA; ²University of California San Francisco, San Francisco, CA. (Tracking ID #2199473)

BACKGROUND: Background: Hospitalization identifies patients who are particularly costly to the Medicare system and current policy efforts to reduce costs focus on the 30 days after discharge; however, much less is known about which patients will have the greatest long-term Medicare costs. Given the prevalence of functional impairment in Medicare seniors and impact on clinical outcomes of hospitalization, we hypothesized that functional impairment would be significantly associated with higher costs of care up to a year after discharge.

METHODS: Methods: We studied 7854 Health and Retirement Study (HRS) subjects who were hospitalized at least once from 2000 to 2010 (18,598 hospitalizations). Our outcome was total post-acute costs for up to 365 days after hospital discharge, assessed by Medicare claims and adjusted for inflation. Main predictor was functional limitations as determined from the HRS interview immediately before the hospitalization and stratified into 5 levels: no functional impairments, difficulty with ≥1 instrumental activity of daily living (IADL), difficulty with ≥1 activity of daily living (ADL), dependency (need for help) in 1–2 ADLs, and dependency in ≥3 ADLs. Adjustment variables included age, race, gender, income, and net worth (obtained from HRS) and comorbid conditions (Elixhauser calculated from Medicare claims), and prior history of admission. We performed

descriptive statistics and multivariable regression analysis adjusted for clustering at patient level to characterize the association of functional limitations and post-acute costs of care.

RESULTS: Results: Mean age was 78 (65–105), 44 % male, 77 % White, 90 % reported ≥ 3 comorbidities, 61 % with ≥ 1 hospitalization in previous year; 48 % had had some level of functional impairment prior to hospital admission. Unadjusted analyses show an increase in post-acute costs as the severity of impairment increases in a dose-response fashion; however, adjusted analyses suggest that this effect applies only to patients with more advanced impairments. While patients with IADL or ADL difficulty did not have significantly higher adjusted costs, those with any level of dependency in ADLs had much

higher adjusted post-acute costs at 1 year: patients with 1–2 ADL dependencies cost \$3235 more (95 % CI \$857–\$5613) and those ≥ 3 ADL dependencies cost \$8289 more (\$4940–\$11,637) compared to patients with no impairments (Table 1).

CONCLUSIONS: Conclusions: Advanced functional impairment (ADL dependency) is associated with significantly higher post-acute costs in Medicare seniors; less severe impairments (ADL or IADL difficulty) are not. Our findings suggest the need for Medicare policy to expand beyond the traditional focus on chronic disease management and explore initiatives to manage advanced functional impairment in order to reduce overall costs of post-acute care for community-dwelling seniors.

Table 1: Association of Functional Impairments with Higher Post-Acute Costs

	Unadjusted N (%)	Adjusted* Mean Total Cost (\$)	Mean Absolute Change (\$)	95 % CI	Mean Absolute Change (\$)	95 % CI
Overall	18,598	32,395				
No Impairments	9765 (52 %)	28,773	reference		reference	
Difficulty with ≥ 1 IADL	2443 (13 %)	31,965	2103	(135,4073)	−698	(−2513,1117)
Difficulty with ≥ 1 ADL	3274 (18 %)	32,997	3925	(2329,5522)	175	(−1277,1627)
Dependency in 1–2 ADL	1991 (11 %)	40,019	10,473	(7620–13,326)	3235	(857–5613)
Dependency in ≥ 3 ADL	1108 (6 %)	49,543	19,708	(15,895–23,522)	8289	(4940–11,637)

*Adjusted for comorbidities (30 Elixhauser conditions), age, race, gender, income, net worth, marital status, education, and hospitalizations in the prior year

AFTER HOSPITALIZATION, FOLLOW-UP WITH YOUR (AND ONLY YOUR) PRIMARY CARE PHYSICIAN IS ASSOCIATED WITH REDUCED READMISSIONS

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BACKGROUND: One intervention that is oft proposed to reduce hospital readmissions is arrangement of early follow-up visits. Studies examining the impact of post-hospital follow-up, however, have not shown an association with reduced readmissions. Furthermore, no studies, to our knowledge, have compared the effect of follow-up visits to Primary Care Physicians (PCPs) vs. non-Primary Care Physicians (non-PCPs). In this study, we measure the impact of the following follow-up visit types on a patient's timing of readmission: 1) Follow-up with the patient's own PCP; 2) Follow-up with another PCP that is not the patient's own; and, 3) Follow-up with a non-PCP.

METHODS: We included patients discharged from the Durham VAMC Medicine service to the community over 43 months. For each, we recorded the time (in days) from discharge to readmission. To measure the associations of readmission with varying types of clinic visits, we recorded the times from discharge to the first follow-up visit with 1) a patient's own PCP; 2) a PCP that was not the patient's own; and, 3) a non-PCP physician. Using survival analysis with the Cox regression method, we measured the association of the various follow-up visits with time to readmission. We controlled for patients' baseline predicted readmission risk. We generated time-dependent predictors to avoid producing artificially low, biased estimates of readmission risk otherwise generated when those patients at the highest risk of readmission are readmitted early and thus unable to arrive for a follow-up visit.

RESULTS: The predicted probability of readmission was positively associated with readmission risk. A visit with one's own PCP was protective and associated with a reduced risk of readmission (HR 0.79, $p < 0.001$, Table 1, Figure 1). This effect was independent of the baseline predicted risk of readmission. The effect of a visit with a non-PCP was hazardous and associated with a significant and near 3-fold increase in risk (HR 2.63, Table 1, Figure 1). There was no apparent effect of follow-up with a PCP that was not the patient's own on readmission (HR 1.00, $p = 0.97$).

CONCLUSIONS: These results are consistent with previous studies in demonstrating that follow-up with an unspecified PCP is not associated with any alteration in the risk of readmission. However, unlike previous studies, we were able to measure the effect of follow-up with one's own PCP on readmission and found it to be protective (and associated with a readmission risk reduction of 25 %). Furthermore, we found that follow-up in the clinic of a non-PCP physician was associated with a near 3-fold increase in readmission risk. These results suggest that efforts to reduce readmissions through post-hospital follow-up should focus on improving access of patients to their own PCPs in the weeks following discharge. Furthermore, we have evidence that follow-up with unfamiliar PCPs are ineffective; worse, follow-up visits with non-PCPs following hospitalization are associated with, and may cause, increased readmissions.

Table 1: Effect of Type of Follow-Up Visit on Readmission: Adjusted Hazard Ratios (HR) from Multivariate Analysis

	HR	95 % CI	p-value
Predicted Probability of Readmission	1.03	1.02–1.04	<0.001
Follow-up Visit with One's Own PCP	0.79	0.69–0.91	<0.001
Follow-up Visit with Another PCP	1.00	0.88–1.14	0.97
Follow-up Visit with non-PCP	2.63	2.27–3.05	<0.001

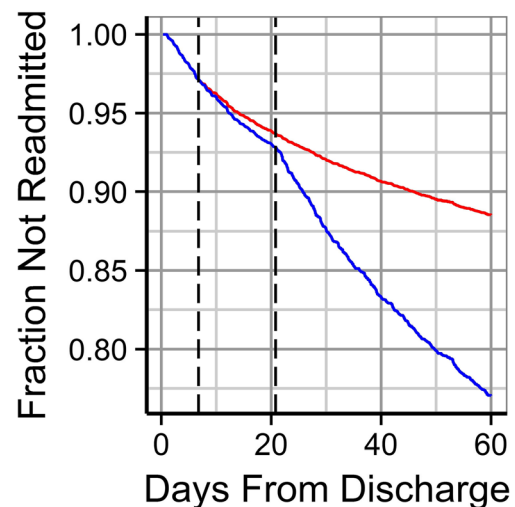


Figure 1: Predicted survival to readmission for a cohort of patients each of whom has a clinic visit with their own PCP at day 7 (red curve) and a cohort of patients each of whom is seen by a non-PCP at day 21 (blue curve).

ALIGNING CLINICAL WITH EDUCATIONAL VALUE: A MULTI-SITE ASSESSMENT OF PATIENTS' NEEDS AND POTENTIAL FOR STUDENT PATIENT NAVIGATORS

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BACKGROUND: Targeting patient needs beyond traditional clinic walls is becoming a primary focus of healthcare reform. New models of health care delivery, such as Accountable Care Organizations, Patient Centered Medical Homes and clinically integrated networks, are being used to address gaps in high-value care delivery. One healthcare delivery role, patient navigation (PN), has been used to improve patient outcomes, and has the potential to be used even more in evolving healthcare models. Although PN is well established in oncology, less is known about the value of PN in other patient populations, including medicine and surgery. Additionally, with the increasing need to provide medical

students with authentic, value-added roles contextualized in systems sciences, we embarked on this project to develop a network of clinical sites within health systems in south-central Pennsylvania able to integrate medical students as PNs in a year-long educational experience. In this study, we explored the views of clinical site leadership regarding: (1) the key systems-related barriers encountered by their patients, and, (2) their perceptions regarding the potential to embed students as PNs to work with these patient populations in need.

METHODS: From January–November 2014, we performed an inductive content analysis of data obtained for the purpose of assessing clinical site willingness to collaborate in student PN. After identifying potential clinical sites within our region, we contacted site leaders, explained the student PN program, and requested a site visit to discuss opportunities. During site visits, we sought to understand the mission of each site, services provided, reported needs of site leaders as to care barriers encountered by patients, and potential for embedding students as PNs. Immediately following each visit, two investigators recorded a reflection on issues discussed and perceptions of receptivity of the program. Following each visit, a digitally-recorded key informant telephone interview with a site member was performed, exploring site demographics, current PN activities performed, and perceived value of student PNs. From these two data sources, the process of constant comparative analyses was used to identify initial themes and categories, and generate a preliminary codebook. Two investigators independently analyzed transcripts and compared codes for agreement. The research team had regular adjudication meetings to review codes, reconcile disagreements, and update the codebook.

RESULTS: To date, 20 site visits and follow-up informant interviews have been completed, with a wide variation in clinical site type, including primary care clinics, inpatient medicine discharge programs, a surgical-oncology transitions program, breast cancer survivorship program, and a state-run Tuberculosis clinic. Each site identified specific patient populations in need of PN, but notably the systems barriers encountered were variable and specific to each clinical site. In our preliminary analysis, several themes of systems barriers were identified, including un-/underinsured, poor access to medications and mental health services, and health literacy. Sites have processes in place to assist patients with specific barriers, including financial assistance programs, medical assistance education by attorneys, medical reconciliation programs, and transportation services; however, they report insufficient resources/staffing to fully realize the benefit of these strategies. Overall, sites had positive perceptions regarding the value-added role for student PNs, specifically with the anticipation of improved patient outcomes from performing tasks such as education about disease, medications, and follow-up appointments, coordinating appointments, linking patients to insurance exchanges, and performing home safety assessments.

CONCLUSIONS: Despite the popularity of PN for cancer populations, our results highlight the potential for expanding PN to a wide range of clinical sites, including outpatient and inpatient settings that care for both medical and surgical patients. Key systems barriers were not consistent across this range of clinical sites, suggesting each local setting must identify and address these factors in developing PN tasks to improve outcomes. Clinics are engaged in closing the gap between delivering care for all facets of patients' needs and the lack of necessary resources needed to accomplish this goal. Despite our initial concerns regarding the receptivity for integrating students in PN roles, site leadership had a positive attitude and willingness to collaborate, specifically because of the perceived impact these roles could have on patient outcomes. With the increasing need to educate collaboratively effective systems physicians, student PN roles that optimize high-value care in our health systems may be an innovative and value-added experience for both students and the health system.

ALLOPURINOL FOR PRIMARY AND SECONDARY PREVENTION OF CARDIOVASCULAR DISEASE Rakshita Chandrashekar¹; Karthik Kannegolla²; Louis Toledo¹; Craig Beam¹. ¹Western Michigan school of medicine, Kalamazoo, MI; ²Western Michigan university, Kalamazoo, MI. (Tracking ID #2199405)

BACKGROUND: Allopurinol is a xanthine oxidase inhibitor with anti-inflammatory properties and hence its key effects would include reducing superoxide anions and other free radicals which exert oxidative stress (OS); to increase tissue oxygen, and to increase hypoxanthine. This paper investigates the effect of allopurinol on cardiovascular events in patients with gout and hyperuricemia.

METHODS: We conducted a retrospective, cross-sectional study of patients at Bronson Methodist Hospital in Kalamazoo, MI, who were diagnosed with gout according to International Classification of Diseases. The protocol was approved by the Institutional Review Board of the hospital. Test group were patients who have been on allopurinol (100–300 mg per day) for at least 5 years and the control group with patients not on allopurinol. Demographics and cardiovascular comorbidities were collected by electronic medical record review. The primary outcome was a composite of hospital admissions for unstable angina, Myocardial Infarction and Congestive heart failure.

RESULTS: To assess the association between allopurinol use and number of admissions for cardiovascular events, a Poisson regression model was fit using data from 124 patients who were diagnosed with gout. Of these, 73 patients had been using allopurinol to manage gout for at least 5 years, while 51 patients who did not use allopurinol in gout management served as the control group. Both groups were controlled for diabetes mellitus, statin use, hypertension, and smoking status. It was found that allopurinol reduced hospital admission for cardiovascular events by nearly 50 % ($p=0.0003$). The mean incidence of cardiovascular admissions in the allopurinol group was estimated to be 0.55 per patient/year while that in the control group was 1.11 per patient/year. These findings provide statistically significant evidence that allopurinol use ($p=0.0003$) related to the incidence of cardiovascular admissions at the $\alpha=0.05$ level when controlling for statin use ($p=0.0192$), hypertension ($p=0.3642$), smoking status ($p<0.0001$), and diabetes mellitus ($p=0.7150$). The insignificance of hypertension and diabetes mellitus indicate these two factors do not add additional predictive ability to the model when allopurinol use, statin use, and smoking status are already present in the model. It is also important to note that the observed sample had only $n=7$ non-hypertensive cases and $n=124$ hypertensive cases. The small n for the non-hypertensive group may have played a role in the lack of significance for hypertension.

CONCLUSIONS: In this study, patients with gout who did not take allopurinol had twice the incidence (50 %) of hospital admissions for cardiovascular events and all-cause morbidity compared to those who took allopurinol. Allopurinol should be considered for primary and secondary prevention of cardiovascular events in patients who have been diagnosed with gout or hyperuricemia. The possible influence of confounding factors is being investigated.

Poisson regression model

Effect	Num DF	Den DF	F value	Pr>F
Allopurinol use	1	118	14.23	0.0003
Statin use	1	118	5.63	0.0192
Hypertension	1	118	0.83	0.3642
Smoking status	1	118	20.18	<0.0001
Diabetes Mellitus	1	118	0.13	0.7150

This table provides the results of fitting the Poisson model. In this model, the effect of allopurinol use is tested while controlling for the effect of statin use, hypertension, smoking status and diabetes mellitus.

AN ANALYSIS OF RECRUITMENT FOR AN ADVANCE CARE PLANNING STUDY IN ADVANCED CANCER PATIENTS Renee R. Stewart; Benjamin Levi; Jane Schubart; Lauren J. Van Scoy; Chengwu Yang; Elana Farace; Michael Green. Penn State College of Medicine, Hershey, PA. (Tracking ID #2198547)

BACKGROUND: Recruitment of participants is an essential component of any research study, yet is a particularly challenging when investigating patients with life-limiting illnesses. Recruiting for advance care planning (ACP) research presents additional challenges due to the inherent sensitivity of end-of-life issues, particularly in the context of terminal cancer. Minimal research exists on how to efficiently recruit individuals for ACP studies. We investigated specific barriers to enrollment for a non-treatment based intervention for end-stage cancer patients.

METHODS: We examined recruitment data from a randomized controlled study that compared efficacy of a novel, interactive online decision aid to a standard advance directive tool. Patients were referred by their oncologists based on the following inclusion criterion: 1) age >18 years 2) stage IV cancer, and/or 3) a life expectancy of less than 2 years. Basic demographics, referring provider, date of recruitment attempts, and recruitment outcomes were recorded. Referrals were categorized by season as follows: winter (Dec–Feb), spring (Mar–May), summer (June–Aug) and fall (Sept–Nov). Eligible referrals were mailed a personalized recruitment letter with self-addressed opt-out cards and subsequently contacted via the telephone 3 weeks later to explain the study, answer questions, and schedule a study visit if interested. We compared characteristics of enrolled patients to those of non-participants using chi-square tests and Mann–Whitney–Wilcoxon tests.

RESULTS: Referrals were provided from thirty oncologists over a 5-year period. Of the 1988 referrals, 90 % ($n=1788$) of patients were classified as non-participants. Among these non-participants, 31 % ($n=545$) returned the opt-out card, 30 % ($n=530$) declined participation via phone, 12 % ($n=217$) were unreachable, 10 % ($n=180$) reported being too ill, 6 % ($n=107$) died prior to contact, 6 % ($n=100$) expressed interest but did not follow-up, 4 % did not attend their scheduled appointment, and 2 % were deemed ineligible after referral. Non-participants were slightly older than enrolled participants (mean 64.2 years (SD 13.1) and mean 62.0 (SD 13.5) respectively, $p=0.02$). Compared to participants, a higher percentage of non-participants were of minority backgrounds (8 %

versus 4 %, respectively, $p=0.03$). On average, non-participants lived further away (50.5 miles, SD 151.6) from the study site than did participants (38.4 miles, SD 52.8, $p=0.01$). Two-thirds of all enrolled participants were recruited after no more than one phone call, whereas only 5 % were enrolled after three follow-up calls. The number of referrals received was significantly lower in winter (13 %) than other seasons (28 % spring, 31 % summer, 28 % fall, $p<0.001$), yet there were no differences in enrollment based on season of referral ($p=0.22$). There were no significant differences between participants and non-participants based on gender ($p=0.881$) or referring specialist ($p=0.07$).

CONCLUSIONS: We found that patients who enrolled in an ACP study lived closer to the study site than non-participants. We identified a diminishing return on time investment with multiple recruitment calls since the majority of patients enrolled within the first phone call. Thus, recruiters with limited time should consider prioritizing efforts on patients who live closest to the study site and towards making initial contact with potential participants.

AN ETHNOGRAPHIC STUDY OF GENERAL MEDICINE INTERPROFESSIONAL ROUNDS: EXPLORING INTERPROFESSIONAL COMPETENCIES

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BACKGROUND: The changing landscape of healthcare service delivery is resulting in expansion of interprofessional collaborative care that address a broad spectrum of medical and social issues. In the setting of a fast paced hospital environment, achieving team function is challenging. Interprofessional rounds are one process for facilitating care coordination in an acute care setting by multiple healthcare providers. Recommended competencies and processes to facilitate interprofessional collaboration, including rounds, are based on theoretical frameworks, such as the CIHC (Canadian Interprofessional Health Collaborative 2010) Interprofessional Competency Framework. This theoretical framework has not been fully validated. We undertook an ethnographic study of interprofessional rounds to identify components (processes or competencies) identified by participants as facilitating this interprofessional activity and compared the identified themes to the CIHC competency framework.

METHODS: This study took place in an academic acute care setting, a general medicine clinical teaching unit (CTU). Each CTU provides care for an average of 25 to 30 patients with multisystem chronic disease. Daily interprofessional 'bullet' rounds are 15 min in duration for each CTU. Participants include the RN coordinator, MD/senior internal medicine residents, RN/LPNs, physical therapy, occupational therapy, speech language pathology, social work, pharmacy, registered dietician, and home care coordinator. An experienced ethnographer observed 8 days of bullet rounds (3 per day) and completed 8 interviews with individual participants following rounds. Thematic analysis of both the rounds observations and interviews was completed.

RESULTS: This ethnographic study focused on themes identified by participants as supporting or hindering the effectiveness of the interprofessional rounds. These themes were then compared to recommended competencies from the CIHC framework. Two themes were clearly identified to facilitate the effectiveness of team function during bullet rounds, and one that limited effectiveness: Team processes that *facilitated* interprofessional rounds: 1. Strength in one's own role: Knowledge of full scope of professional practice that meets individual patient care needs. Being familiar with what each professional brings to the care of an individual patient, rather than familiarity with the roles of other healthcare professionals, brings more depth to the patient care discussion at interprofessional rounds. 2. Cognitive conflict regarding roles for each patient: facilitates information sharing and discussion of care coordination. Cognitive conflict arises as each profession applies their expertise in providing care for an individual patient, sometimes with different perspective on care needs. Resolving this cognitive conflict adds to care coordination and increases job satisfaction during rounds. Team processes that *hindered* interprofessional rounds: 1. Differing objectives for the round by participants: Acute care care coordination vs rounds with the intent of discharge. These two different objectives resulted in different perspectives on information to be discussed and intended outcomes of the discussion. Focusing on discharge limited participation in discussion by several healthcare professionals who brought information to discuss regarding acute care coordination during the hospital stay. The key components of the CIHC framework are role clarification, interprofessional conflict resolution, collaborative leadership and team functioning. Role clarification is defined as "learners/practitioners understand their role and roles of others..." In our study, the emphasis was on being familiar with one's own role and to bring this knowledge to rounds. Being familiar with the roles of others was not identified by any of the participants. Cognitive conflict supports role clarification of one's own role and introduced a different aspect to interprofessional conflict resolution with positive outcomes to interprofessional discussion of care. Collaborative leadership needs to include shared objectives or intended outcomes of interprofessional activities such as bullet rounds.

CONCLUSIONS: Competency frameworks provide a guide for developing components of interprofessional healthcare delivery; however, further validation, both for establishing interprofessional practices in individual healthcare settings and for furthering interprofessional education, needs to occur through in depth qualitative research methods.

AN EVALUATION OF COMPUTERIZED MEDICATION ALERT OVERRIDE BEHAVIOR IN INPATIENT AND AMBULATORY CARE

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BACKGROUND: Evidence suggests that computerized decision support (CDS) improves care, but the amount of improvement achieved is typically a fraction of what is possible. Understanding how physicians respond to CDS alerts is a critical factor in improving care with the electronic health records (EHRs). Application of the CDS alert functionality has been variable between inpatient and outpatient providers and we continue to observe a high level of medication alert overrides for many prescription domains. While many overrides are justified clinically, some are not. It is important to reach out to those providers who are not prescribing optimally and understand their reasons for overriding alerts, and how they differ in inpatient and ambulatory care.

METHODS: We evaluated all Level 2 alert overrides that required a coded reason to be provided at the time of prescribing between January 2009 and December 2011. We limited our sample to providers who had received 20 or more alerts in any of the prescribing domains (drug-drug interaction alerts, drug-allergy interaction alerts, renal suggestion alerts, non-formulary alerts and age-based alerts) and the number of times each provider override these alerts was calculated. Of the 2495 providers eligible for the study, 1770 inpatient and 725 ambulatory, those with a high inappropriate override rate were targeted for academic detailing sessions. Research pharmacists trained in effective counter-detailing techniques conducted these sessions, each of which was tailored to the provider's particular overrides. Graphical material including performance level data, a list of their inappropriate overrides and supporting evidence-based summaries, was presented to each provider and this was used as the prime basis for a two-way discussion. A robust and complete analysis of the data was carried out and prevalent concepts related to general views on alert functionality and specific prescribing behavior identified.

RESULTS: We conducted 42 total academic detailing sessions, 34 with outpatient and 8 with inpatient providers. Overall, clinicians were generally favorable towards the alerts and felt that they were helpful in identifying possible adverse events. Providers were especially grateful for alerts informing them about the risk of drugs they infrequently use. However, many providers in the inpatient setting felt that alerts that reminded them to monitor the patient were extraneous. Providers ignored these warnings in the hospital because they were seeing their patients regularly independent of the alerts. They would like the option to disable alerts they consistently override and ignore. Regarding non-formulary alerts in the inpatient setting, physicians would like to see alternatives that are on formulary as well as the cost differential between the two options built into the alerts. Clinicians in the inpatient setting would rather override a drug allergy alert than make changes to a patient's allergy record if it was incorrect. They felt that responsibility should lie with the patient's primary care provider. In the outpatient setting, providers found that the clinical relevance of the alerts could be improved by providing recent laboratory values, as well as the ability to order additional tests directly from the alert.

CONCLUSIONS: A number of insights were identified through academic detailing sessions including that alert fatigue existed for warnings deemed irrelevant, and frustration that repetitive alerts cannot be disabled. Providers in the inpatient setting were more frustrated than those in the ambulatory environment when prompted to monitor their patients. The alerts were appreciated when the provider first saw the patient, however subsequent alerting was seen as frustrating and time consuming. Clinicians would like to see repetitive inpatient alerts less frequently. By incorporating provider preferences, customizing alerts to the context of the visit and considering the increased attention patients receive in a hospital; providers felt that CDS alerts would be less likely to be overridden providing more effective, efficient care.

AN EVALUATION OF THE IMPACT OF CALIFORNIA'S TRANSITION TO MANAGED CARE ON HEALTH CARE UTILIZATION BY MEDICAID SENIORS AND PERSONS WITH DISABILITIES

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BACKGROUND: Moving high-cost, medically complex Medicaid enrollees into managed care is a strategy states have used to stabilize health care spending and improve access, service coordination, and care outcomes for vulnerable populations. Little data exist to ensure that such transitions are effective in achieving these goals. California's recent transition of Medicaid seniors and persons with disabilities (SPDs) in 16 counties from traditional fee-for-service to

managed care offers an opportunity to evaluate the impact of a managed care expansion on health-related outcomes for this important patient population.

METHODS: L.A. Care Health Plan in Los Angeles County, the nation's largest not-for-profit provider of Medicaid managed care, was assigned over half of the SPDs transitioned in the state during the 12-month implementation between June, 2011 and May, 2012. We matched 12 months of pre-transition paid claims obtained from California's Department of Health Care Services to 12 months of post-transition managed care encounter-level data provided the plan. Monthly rates of outpatient physician visits, emergency department visits, and hospital admissions were calculated based on the number of eligible individuals each month, yielding events per 1000 member months (PMM). Utilization rates are reported with respect to each individual's transition month. We used negative binomial GEE regression models to compare rates between the four six-month pre- and post-transition intervals while accounting for repeated measurements. Differences in rates were evaluated using contrasts.

RESULTS: Of 148,923 individuals assigned to L.A. Care through the transition, we identified 103,656 (69.6%) matched individuals with at least one month of post-transition plan enrollment. The final sample includes 94,772 individuals ≥ 18 years. The sample's mean pre-transition Medicaid eligibility and post-transition plan enrollment was 11 months

in both periods. Outpatient physician visits (Fig. 1) were stable for the 12 months preceding the transition at approximately 370 visits PMM ($p=0.64$ for -12 to -6 months vs. -6 to 0 months contrast), then reached a new steady state of 250 visits PMM after the early post-transition period when visits dropped as low as 160 visits PMM ($p<0.001$ for the contrast). Inpatient hospital admissions (Fig. 2) rose from 30 to 35 admissions PMM pre-transition ($p<0.001$), then dropped post-transition to approximately 25 admissions PMM ($p<0.001$). The drop in inpatient hospitalizations appears to be primarily due to fewer elective admissions. ED visit rates were variable, rising from approximately 67 PMM pre-transition to 79 PMM immediately prior to managed care enrollment ($p<0.001$). Post-transition, ED visits fell to approximately 73 visits PMM after the second post-transition month, and were relatively stable thereafter ($p=0.02$).

CONCLUSIONS: The transition of Medicaid SPDs in Los Angeles County to managed care was associated with overall reductions in ambulatory care visits and acute hospital admissions. Utilization patterns occurring around the transition period raises concerns that beneficiaries may have attempted to manage potential loss of access during the transition. Future analyses using these data will include examination of additional months of post-transition utilization data, types and appropriateness of care, and subgroup effects.

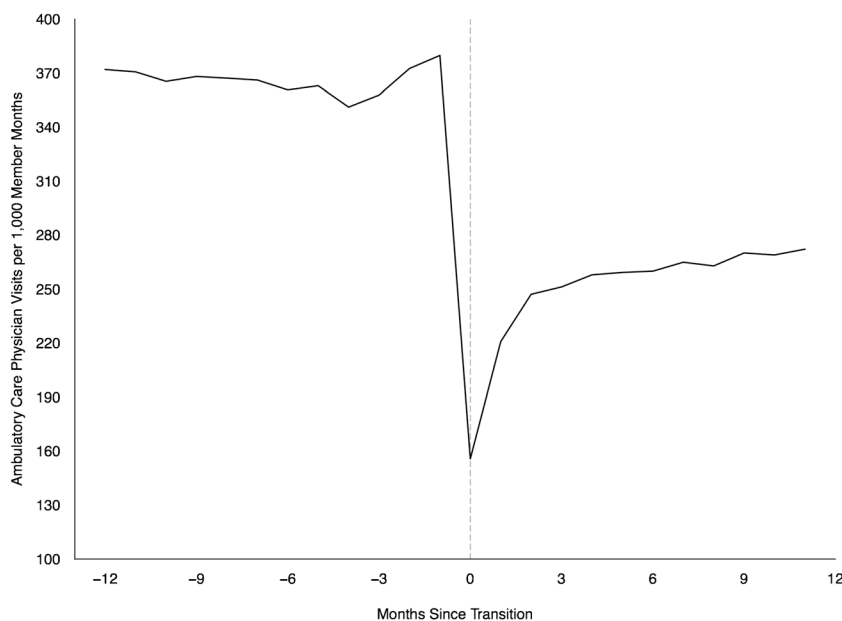


Figure 1

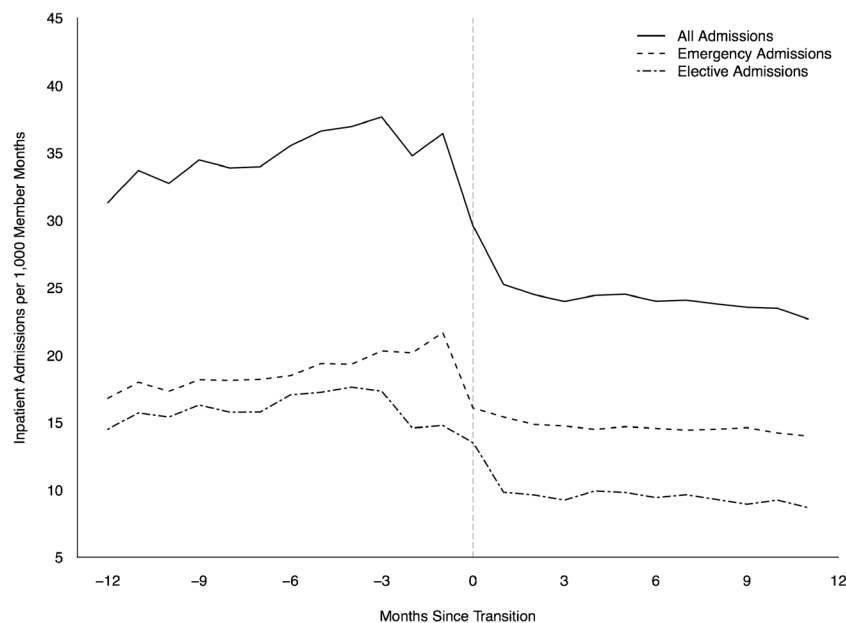


Figure 2

AN INTERVENTION TO IMPROVE HOSPITAL CARE DELIVERED ON WEEKENDS Saul Blecker^{1, 2}; Keith Goldfeld¹; Hannah Park¹; Martha J. Radford^{1, 2}; Sarah Munson¹; Fritz Francois^{1, 2}; Jonathan Austrian^{1, 2}; R. Scott Braithwaite^{1, 2}; Katherine A. Hochman^{1, 2}; Richard Donoghue²; Bernard Birnbaum²; Marc N. Gourevitch^{1, 2}. ¹New York University School of Medicine, New York, NY; ²NYU Langone Medical Center, New York, NY. (Tracking ID #2195188)

BACKGROUND: Hospital care on weekends has been associated with delays in care, reduced quality, and poor clinical outcomes. The “7-Day Hospital Initiative” was a hospital-based intervention designed to improve patient throughput and quality of care delivered on weekends. The purpose of this study was to evaluate the impact of the intervention on processes of care and clinical outcomes at an academic medical center.

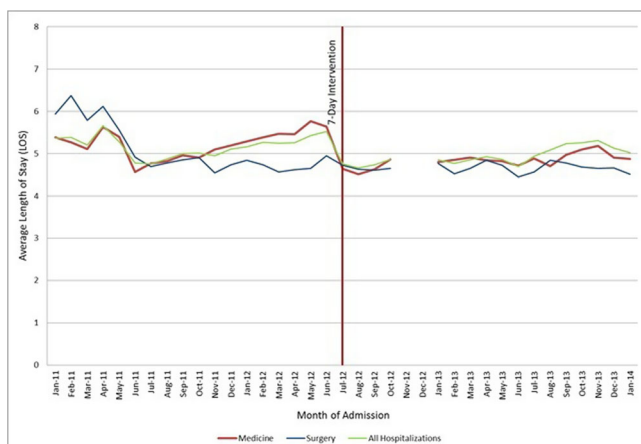
METHODS: The multifaceted inpatient intervention consisted of the following components: 1) expanded access on weekends to diagnostic procedures (echocardiography, cardiac stress tests, radiological services including interventional radiology); 2) expanded hospitalist coverage on the Medicine service on weekends, with improved structure for patient handoffs from weekday to weekend providers; 3) increased care management staffing on weekends; 4) implementation of standard weekend interdisciplinary rounds; 5) increased elective weekend surgeries (primarily outpatient). To study the impact of the intervention, we performed an interrupted time series observational study of adult non-obstetrical patients between January 2011 and January 2014. The primary outcome was average length of stay. Secondary outcomes included percent of patients discharged on weekends, 30-day readmission rate, and in-hospital mortality rate. We used segmented regression analysis with adjustment for confounders to determine associations between the intervention and outcomes.

RESULTS: The study included 57,163 hospitalizations. Following implementation of the intervention in July 2012, average length of stay decreased by 13 % and continued to decrease by 1 %/month as compared to the underlying time trend (Figure). The reductions in length of stay were observed on the Medicine service but not on Surgery ($p < 0.001$ for difference; Figure). The percent of weekend discharges increased by 12 % at the time of the intervention and continued to increase by 2 %/month thereafter (Table). The intervention had no impact on readmissions or mortality (Table). During the post-implementation period, the hospital was evacuated and closed for 2 months due to damage from Hurricane Sandy and a new electronic health record was introduced in our medical center. We observed a lower inpatient census and found differences in patient characteristics, including higher rates of Medicaid insurance and comorbidities, in the post-Hurricane Sandy period as compared to the pre-Sandy period.

CONCLUSIONS: The 7-Day Hospital Initiative, a multi-component intervention to increase hospital services on weekends, was associated with a reduction in length of stay and an increase in weekend discharges. The study also illuminated the challenges of evaluating the effectiveness of a large scale intervention in a real world hospital setting.

Results of the interrupted time series analysis evaluating the effect of the 7-Day Hospital Initiative on outcomes. The Change in Level and Change in Rate indicate whether the intervention had an immediate or ongoing effect on the outcome of interest, respectively.

Outcome	Rate of Change, pre-Intervention	Change in Level, Introduction of Intervention	Change in Rate, post-Intervention
Length of Stay	1.01 (1.01, 1.02)	0.87 (0.85, 0.90)	0.99 (0.98, 0.99)
% Weekend Discharges	0.99 (0.99, 1.00)	1.12 (1.02, 1.22)	1.02 (1.01, 1.03)
Readmission	0.99 (0.99, 1.00)	0.90 (0.81, 1.01)	1.01 (0.99, 1.02)
Mortality	0.99 (0.97, 1.00)	1.10 (0.84, 1.44)	1.02 (0.99, 1.05)



Trends in adjusted length of stay, by month. July 2012 represents the beginning of the 7-Day Hospital Initiative. Data from November and December 2012 are missing due to hospital closure related to Hurricane Sandy.

ANALYSIS OF 510,713 ALCOHOL DEPENDENT PATIENTS LEAVING AGAINST MEDICAL ADVICE IN THE LAST 10 YEARS: BURDEN ON HEALTH ECONOMY Rakshita Chandrasekar¹; Karthik Kannegolla². ¹Western Michigan school of medicine, Kalamazoo, MI; ²Western Michigan university, Kalamazoo, MI. (Tracking ID #2199191)

BACKGROUND: Alcohol dependence is a condition resulting from prolonged and usually intense consumption of alcohol which has resulted in psychological and/or physiological dependence on alcohol consumption. This dependence results in significant problems in one or more areas of the person's life. Millions of dollars are spent on these patients initially for their treatment but the patients decide to leave against medical advice (AMA) with incomplete treatment causing significant financial losses in the economy. Our aim is to assess the demographics of alcohol dependent patients that left AMA in 2012 and to also assess the trend of discharges from 2002–2012.

METHODS: Nationwide Inpatient Sample (NIS) database is developed through Agency of Healthcare and Research quality through federal-state funded partnership and represents 20 % of all the hospitalizations in USA. NIS data was used to extract demographics of alcoholic patients who left AMA for the year 2012 like the number of discharges, location and teaching status of hospitals, hospital regions, mean length of stays (LOS) in hospitals, mean hospital charges (in dollars), insurance payers and the trends of discharges from 2002 to 2012 using Diagnosis Related Group (DRG).

RESULTS: We extracted data for 43,440 alcohol dependent patients who left AMA in 2012. Their mean LOS was 2.4 days. Majority of patients (57.29 %) were between age group of 18–44 years, followed by patients between 45 and 64 years (40.07 %) with men leaving AMA three more often than women. Most patients were admitted in private, not for profit hospitals (77.04 %), in urban teaching hospitals (56.54 %), hospitals with large bed size (49.01 %) and were covered for by Medicaid (39.05 %) or private insurance (20.03 %). Most patients were from northeastern part of USA (50.06 %) followed by Western part (12.13 %). The cost of hospitalization in the West is more when compared to Hospitals from the Northeast (\$16,000 vs \$9825) though the former have far less cases reported. The mean hospitalization charge per patient was \$10,415 and the total national aggregate charge was close to 453 million dollars. There were 510,700 patients who left AMA between 2002 and 2012. The maximum number of cases were in the year 2006 (53,073 cases), and minimum in 2003 with 41,041 cases. There has been no change in median LOS in hospitals in the last 10 years but the mean charges have increased from \$6000 in 2002 to greater than \$10,000 per patient.

CONCLUSIONS: Our study reports the demographic distribution that greater than 55 % of cases that left AMA are treated by urban teaching hospitals and close to 50 % cases are from the Northeast due to unknown factors. More than 452 million dollars are being spent annually on this subset of the population who leave before the completion of treatment is accomplished. By investing in programs dealing with social and psychological factors that lead to them leaving AMA, recurrent admissions for partially completed treatments could be limited, thereby reducing burden of millions of dollars on healthcare economy.

ARE RESEARCH ETHICS COMMITTEES PREPARED FOR COMMUNITY BASED PARTICIPATORY RESEARCH? Leonardo Tamariz; Ana M. Palacio; Olveen Carrasquillo. University of Miami, Miami, FL. (Tracking ID #2199123)

BACKGROUND: Community-based participatory research (CBPR) is a collaborative approach to research that involves all partners in the research process and recognizes the unique strengths that each brings. This new research methodology presents a variety of challenges for research ethics committees (RECs). The purpose of this study is to summarize the evidence supporting the level of preparedness that RECs have when reviewing CBPR projects.

METHODS: We performed a search of the MEDLINE database (1966 to December 2014) supplemented by manual searches of bibliographies of key relevant articles. We included studies that used surveys of researchers or REC members, evaluations of the forms and procedures of the REC and case studies reporting on experiences when submitting a CBPR project through a REC.

RESULTS: The search strategy yielded 42 studies, of which only 8 met our eligibility criteria. Five studies reported results of surveys of researchers and REC members and three studies reported on qualitative experiences of case studies when submitting a CBPR project through a REC. Three studies evaluated the REC's submission/reviewer forms and found that the community involvement could be elicited in a median of 5 % (range 0–

15 %) of all forms in 131 RECs from the US and Canada. One study surveyed community partners of CBPR projects who reported that common challenges when working with RECs were delays and lack of understanding of CBPR principles. One study surveyed REC members and found that they felt prepared to review CBPR projects. Facilitators of approval of CBPR projects were adequate communication between the REC and the community, use of community advisory boards, and having a large number of research projects. The case studies of researchers trying to submit CBPR projects to RECs, consistently reported frustration related to delays and refusal to approve, lack of understanding of community ethics, dealing with multiple RECs, risk determination, and research protection oversight.

CONCLUSIONS: RECs are not prepared to evaluate CBPR projects based on evaluation of the REC forms and process. This lack of preparedness leads to unnecessary delays in the approval process and is related to REC members not being familiar with the CBPR principles. CBPR training and better communication with the community are key to improving the process.

ASSESSING LEARNER ENGAGEMENT AND KNOWLEDGE: USE OF TEAM BASED LEARNING FOR INTERNAL MEDICINE AMBULATORY RESIDENT TEACHING Sandy Balwan²; Alice Fornari¹; Paola Dimarzio²; Jennifer Verbsky²; Renee Pekmezaris²; Saima Chaudhry³. ¹Hofstra NSLIJ SOM, Hempstead, NY; ²North Shore LIJ Health System, Great Neck, NY; ³nslij, Manhasset, NY. (Tracking ID #2185058)

BACKGROUND: Traditional resident teaching is a passive process that does not model the “active learning” strategies currently promoted in medical education. Team Based Learning (TBL) is an active strategy commonly used in Undergraduate Medical Education (UME) to facilitate higher order content learning, promote high levels of learner engagement and collaboration, and foster positive learner attitudes. However, there is little data on the effect of TBL in Graduate Medical Education (GME) on medical resident and faculty engagement and satisfaction, and residents’ medical knowledge.

METHODS: In 2012, we replaced our didactic based ambulatory medicine curriculum with a TBL pedagogical approach to support our ambulatory curriculum. We are a large internal medicine residency program using two different ambulatory sites. The specific aims of this study was to determine whether TBL improves: 1) medical resident and faculty engagement and satisfaction, and 2) residents’ medical knowledge assessed by multiple readiness assurance tests. We assessed medical knowledge using individual (IRAT) and group readiness assurance (GRAT) tests. A prior validated survey was used to measure resident involvement, contribution, participation, and engagement. We used a modified Nominal Group Technique (NGT) to provide semi-quantitative, rank-ordered feedback on participant perceptions of medical education experiences. Residents and faculty who experienced both the traditional model and the TBL approach were asked the following: “Compared to the traditional didactic based ambulatory learning sessions used last academic year, please comment on the strengths and weaknesses of the TBL curriculum used this academic year.”

RESULTS: For all modules, the average GRAT score was significantly higher than the average IRAT score, with a range of improvement from 10 to 31 points (Wilcoxon signed rank tests for all matched pairs ($p < 0.0001$ for all seven modules). The survey response rate for residents and faculty was 61 and 85 %, respectively. The vast majority of faculty and residents agreed or strongly agreed that: 1) most residents were actively involved in TBL sessions, 2) contributed meaningfully to group discussions 3) talked with other residents about the material in each session, 4) contributed their fair share to the TBL session; 5) paid attention 6) participated in session discussions and 7) were perceived to be learners in the discussion. Results from our NGT show that both residents and faculty thought the most important strength of the TBL curriculum was the interactive format with group work. Residents and faculty also reported that the competition between residents was a positive aspect of TBL. Interestingly, residents and faculty both ranked the format of TBL as both a strength and a weakness.

CONCLUSIONS: Both our survey and NGT results support our hypothesis that TBL promotes resident engagement. Positive feedback from the NGT data, from both residents and faculty, support the premise that learning in teams is favorable and creates a teaching environment where learners are engaged. In terms of knowledge, GRAT scores consistently increased for each clinical topic and overall composite knowledge scores increased by approximately 22 %. Survey results reported residents being actively involved in TBL sessions, contributing to group discussions and actively discussing the subject material with other residents. Faculty echoed similar responses and both residents and faculty reported that they would like more teaching session to be offered using the TBL pedagogy. In conclusion, TBL resulted in active resident engagement, improved group medical knowledge, and increased satisfaction by residents and faculty with learning specifically focused on the care of patients in the ambulatory setting.

Table 1: TBL Process

Session	Activity
Pre TBL Session	Residents emailed relevant articles and cases
Day 1	Administration of IRAT/GRAT with faculty facilitating the discussions of the questions. IRAT/GRAT collected.
Day 2	Clinical vignette with eight learning objectives distributed to residents. Faculty facilitates residents reading of case and choosing two additional learning objectives.
Day 3	Residents report out on all learning objectives.
Post TBL Session	Residents complete peer evaluations and peer evaluations distributed to respective residents

ASSESSING SENIORS’ NORMATIVE BELIEFS AND SHARING OF HEALTH INFORMATION ABOUT THE PNEUMOCOCCAL VACCINATION Crystal T. Doan¹; Shira N. Goldman¹; Tiffany Brown¹; Stephen D. Persell¹; Alpa Patel²; Kenzie A. Cameron¹. ¹Northwestern University Feinberg School of Medicine, Chicago, IL; ²Northwestern Medicine, Chicago, IL. (Tracking ID #2195864)

BACKGROUND: In 2012, only 59.9 % of seniors were vaccinated against invasive pneumococcal disease, despite the Healthy People 2020 goal of 90 % vaccination. Prior research has found that physician recommendations and patient attitudes may be more powerful predictors of pneumococcal vaccination (PnVx) than patient access to medical services. It remains unclear how patients’ normative beliefs about PnVx influence their vaccination decisions. Normative beliefs are perceptions of how the general population behaves and judgments toward these behaviors. They can be divided into: 1) injunctive norms, i.e., individuals’ perceptions of what should be done, based on what is socially acceptable; and 2) descriptive norms, i.e., individuals’ perceptions about the prevalence of a behavior. We assessed individuals’ normative beliefs, and explored differences by race and receipt of PnVx. We also assessed if patients discussed pneumonia and PnVx with anyone following a clinic visit.

METHODS: English-speaking patients age 65 and 66 from an academic general internal medicine clinic were recruited to participate in a telephone survey to assess their normative beliefs about pneumonia and PnVx approximately 1 week following their clinic visit. As part of a larger study, these patients had been shown a brief, 2-min educational video about PnVx at that visit. To assess normative beliefs, we created a 4-item injunctive norm scale ($\alpha = 0.69$; e.g. “In general, most people think it is a good idea to get the pneumonia shot”) and a 3-item descriptive norm scale ($\alpha = 0.78$; e.g. “I think that most people who are 65 or older get the pneumonia shot”). Patients responded on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

RESULTS: Participants ($N = 72$) had a mean age of 65.2, were 62.5 % female, 36.1 % identified their race as Black and 55.6 % as White, and 94.4 % had at least some college education. There was no variation by race on receipt of PnVx, with 52.8 % of patients reporting receipt at their recent clinic visit. Patients’ injunctive norms slightly supported receipt of PnVx ($M = 3.70$, $sd = 0.84$), but their descriptive norms toward receipt of PnVx were neutral ($M = 3.13$, $sd = 1.20$). Overall, neither injunctive nor descriptive norms differed between Black (injunctive norms: $M = 3.44$, $sd = 0.93$; descriptive norms: $M = 2.84$, $sd = 1.47$) and White patients (injunctive norms: $M = 3.81$, $sd = 0.76$; descriptive norms: $M = 3.25$, $sd = 1.01$). In addition, neither injunctive nor descriptive normative beliefs differed among participants based on self-reported PnVx vaccination status. Overall, participants had high agreement with the statement “My doctor thinks I should get the pneumonia shot” ($M = 4.63$, $sd = 0.83$). Compared to participants who did not receive the vaccine, those who received PnVx at their clinic visit were significantly more likely to discuss pneumonia and PnVx with others ($\chi^2 = 8.30$, $p = 0.016$). Participants discussed pneumonia and PnVx after their clinic visit with friends and acquaintances ($n = 22$), family members ($n = 19$), partners or spouses ($n = 17$), and other medical professionals ($n = 5$). However, half (55.6 %) of patients reported being unaware that PnVx was covered by Medicare.

CONCLUSIONS: In our sample, we discovered no racial differences when exploring participants’ injunctive and descriptive norms toward receipt of PnVx. Not surprisingly, participants strongly agreed that their physicians supported receipt of PnVx. However, only half of those eligible received PnVx at their recent visit, and over half were unaware that Medicare covers the cost. These findings from our small sample at a single site could suggest that factors other

than injunctive and normative beliefs are driving vaccination behavior. It is notable that those who received PnVx were likely to share information regarding pneumonia and PnVx with others after their visit, showing the proliferation of health communication beyond the medical encounter. Further research should explore both the content of this shared information as well as how best to utilize social networks to improve PnVx rates.

ASSESSMENT OF OPERATIONAL DEFINITIONS FOR MEDICATION ADHERENCE USING LONG-TERM OUTCOMES IN PATIENTS WITH HYPERTENSION Karen Tang; Hude Quan; Doreen Rabi. University of Calgary, Calgary, AB, Canada. (Tracking ID #2195940)

BACKGROUND: Medication adherence is defined as the extent to which a patient takes prescribed medications according to the dosage and frequency recommended by the provider. Research studies examining medication adherence tend to use pharmacy data, indirectly measuring adherence using the “medication possession ratio” [MPR] or the “proportion of days covered” [PDC]. Despite widespread use of these terms, there are in fact no standard operational definitions for adherence, nor is there a standard method of measuring adherence in patients using concurrent medications (termed “polytherapy”). In order to determine whether the use of different operational definitions results in different conclusions regarding adherence and outcomes, we aimed to compare and contrast adherence rates and association with mortality using MPR and PDC definitions of adherence, and using various methods of handling polytherapy.

METHODS: We conducted a cohort study of patients aged ≥ 65 years from Manitoba, Canada, with incident hypertension diagnosed in 2004, and followed up to 2009. Drug data were obtained from the Manitoba Pharmacare prescription database. We calculated and compared adherence rates to anti-hypertensive medications using the following operational definitions for medication adherence: MPR using a fixed observation interval of 1 year (“MPR_i”=days supply/365 days), MPR using a prescription based interval (“MPR_p”=days supply excluding last refill / (last refill date - first fill date)), and PDC (calculated as the number of days where at least one medication is available / 365 days). For patients on polytherapy, four different MPR_i and MPR_p’s were calculated: 1) MPR to any antihypertensive medication (“sum MPR”); 2) mean of the class-specific MPR’s for each anti-hypertensive medication prescribed (“mean MPR”); 3) the lowest of the class-specific MPR’s (“low MPR”); and 4) the highest of the class-specific MPR’s (“high MPR”). All adherence measures were dichotomized using the standard threshold of 0.80 such that patients with MPR’s or PDC’s greater than 0.80 were considered “adherent” to their medications. Logistic regression and Cox regression were performed to determine the association between medication adherence using these operational definitions and mortality.

RESULTS: Our final cohort consisted of 2199 patients. Mean age (SD) was 75.2 (7.0) years, 45.5 % were male, and 64.7 % were on monotherapy. For those on monotherapy, 71.8 % were considered adherent when using MPR_i or PDC definitions, and 76.7 % were considered adherent when using the MPR_p definition. For those on polytherapy, the proportion considered adherent ranged from 24.1 to 90.5 % using MPR_i, depending on the method used to manage concurrent medications, compared to 71.2 to 92.7 % using MPR_p measures. Using the “mean MPR_i” and “mean MPR_p” measures, the proportion considered adherent were 33.7 and 81.0 % respectively. Adjusted logistic regression showed a trend toward adherence being inversely associated with death for all definitions, with the association being strongest for MPR_p measures (adjusted OR 0.71 to 0.78 [95 % confidence interval (CI) 0.53, 0.86 to 0.58, 1.03] for MPR_p measures; aOR 0.80 to 0.90 [95 % CI 0.59, 1.09 to 0.68, 1.19] for MPR_i measures). For patients on polytherapy, this association was significant only with mean MPR_p [aOR 0.71, 95 % CI 0.53, 0.95] and sum MPR_p [aOR 0.72, 95 % CI 0.51, 0.99] measures, but not with the highest or lowest class-specific MPR_p’s, or with any MPR_i or PDC measures.

CONCLUSIONS: The range of adherence estimates varies widely depending on the operational definition for adherence used, especially for patients taking more than one medication concurrently. The use of fixed observation intervals versus prescription based intervals as the denominator in MPR definitions also results in substantially different conclusions about medication adherence. These findings call for transparency in medication adherence research, such that the operational definition used is clearly defined, as well as for the development of a harmonized and accepted standard operational definition of adherence. Given less variation in adherence rates calculated by MPR_p measures and its stronger association against mortality,

MPR_p (specifically mean or sum MPR_p for those on polytherapy) are the recommended operational definitions for medication adherence.

ASSOCIATION BETWEEN DIABETES SELF-CARE AND PERCEIVED SUPPORT IN A SAMPLE OF LOW-INCOME AFRICAN AMERICANS Brittany D. Payne²; Robert Oster¹; John P. Shelley¹; April A. Agne¹; Andrea Cherrington¹. ¹University of Alabama Birmingham, Birmingham, AL; ²University of Alabama at Birmingham, Birmingham, AL. (Tracking ID #2199151)

BACKGROUND: Self-care behaviors are important to diabetes care and health outcomes. Studies suggest that social support is positively linked to self-care behaviors in patients with diabetes; however, the research examining social support and diabetes in minority communities is more limited. The purpose of this study was to investigate the multiple dimensions of social support and its relationship with diabetes self-care behaviors among African Americans. Specifically, we measured perceived support from health care professionals, as well as family and friends, and its relationship to medication adherence and an additional five diabetes self-care behaviors.

METHODS: We surveyed 119 low-income African American adults diagnosed with type II diabetes living in Birmingham, AL as part of the baseline assessment for a study examining the influence of community health workers on diabetes-related self-care, education, and outcomes. Participants were recruited from a local safety net health system and were included if they had diagnosed diabetes, poor glycemic control (HbA1c >7.5), and had been seen at the clinic within the last 2 years. Using previously validated measures, participants were queried regarding self-care activities (general diet, specific diet, exercise, blood glucose testing, and foot care), medication adherence, diabetes distress, depression, and social support. Support from the health care team was assessed using two items, one regarding perceived support and the other, satisfaction with support received. Perceived support from family and friends was assessed using a 5 item scale. Spearman (nonparametric) correlation analysis was used to determine bivariate associations. Statistical tests were two-tailed and were performed using a significance level of 5 %.

RESULTS: Our study population comprised 80 female and 39 male participants, age 31 and older (mean=55, SD=8), with about 1/2 having completed at least a high school level education. Participants had average HbA1c=10 % and had been diagnosed with diabetes for about 9 years. While a majority of study participants (88 %) use cell phones, about 65 % never or rarely use text messaging or internet. Satisfaction with the support from the health care team was significantly associated with all 5 self-care behaviors ($p=.001, .048, .001, .049, .042$, respectively) as well as medication adherence. Perceived amount of social support from the health care team was significantly associated with general diet and exercise ($p=.008$ and $.045$, respectively). Both amount of support and satisfaction from the health care team were positively associated with age, education, and the extent to which the participant used text messaging and internet ($p=.002$ and $.011$ for amount of social support, and $p=.001$ and $.001$ for satisfaction with social support). Perceived social support from family and friends was positively associated with medication adherence ($p=.001$) but not the other self-care behaviors. Women were more likely to report support from family and friends ($p=.041$) and depression was inversely related to such support ($p=.001$). Higher levels of support from the health care team and from family and friends were associated with less diabetes distress ($p=.004$).

CONCLUSIONS: Findings in this study of low income African Americans with diabetes indicate that perceived support influences diabetes self-care. Satisfaction with the health care team was associated with the highest number of self-care behaviors, though perceived amount of support from the health care team and support from family and friends were both positively associated with some behaviors. While overall use of text messaging and internet was low, individuals engaging in these behaviors reported higher levels of social support. Diabetes specific distress was mitigated by support from both the health care team and family and friends.

ASSOCIATION BETWEEN FRAILTY AND 30-DAY OUTCOMES AFTER DISCHARGE FROM GENERAL INTERNAL MEDICINE WARDS: A MULTI-SITE PROSPECTIVE COHORT STUDY Sharry Kahlon; Sumit R. Majumdar; Jenelle Pedersen; Sara Belga; Darren Lau; Miriam Fradette; Debbie Boyko; Jeffery Bakal; Curt Johnson; Raj S. Padwal; Finlay A. McAlister. University of Alberta, Edmonton, AB, Canada. (Tracking ID #2198558)

BACKGROUND: Readmissions within 30-days of hospital discharge are common and costly but prediction models are poor at identifying those at high risk of being readmitted. Frailty is a multi-dimensional syndrome not routinely captured by administrative databases that may improve clinical prognostication.

METHODS: We prospectively enrolled 500 patients discharged from 7 GIM wards at 2 teaching hospitals in Edmonton, Alberta Canada. "Frailty" was defined as 5-points or more on the previously validated 9-point Clinical Frailty Score (CFS). The primary outcome was the composite of 30-day readmission or death. Multiple logistic regression analyses, adjusted for age and sex, were undertaken to compare 30 day outcomes between frail and non-frail patients.

RESULTS: Of the 500 patients we recruited, 164 (33 %) met the CFS definition of frailty: 93 (19 %) were mild (CFS score 5), 60 (12 %) were moderate (CFS score 6), and 11 (2 %) were severely frail (CFS score 7 and 8). Frail individuals were older, more likely to be female, had more comorbidities and lower EQ-5D scores, and higher LACE scores at discharge, but had similar mean serum albumins and mean scores on depression, cognitive, and anxiety scales as non-frail subjects. Overall, 96 patients were readmitted or died within 30 days of discharge, and frail patients exhibited higher event rates: 44 (27.2 %) vs. 52 (15.6 %), OR 2.02 (1.28–3.18). Even after adjusting for age and sex, frailty remained associated with 30 day outcomes (aOR 2.01, 95%CI 1.21–3.33 for frailty and aOR 2.12, 95%CI 1.18–3.81 for moderate-severe frailty).

CONCLUSIONS: In individuals discharged from general medical units, frailty was common, was associated with substantially increased risk of adverse events, and the CFS could potentially be used to identify those individuals in whom to target interventions to reduce hospital readmissions.

ASSOCIATION BETWEEN NEIGHBORHOOD SOCIAL SUPPORT AND QUALITY OF DIABETES CARE

Roberto O. Diaz Del Carpio; Wudeneh Mulugeta; Scott Stewart. University at Buffalo, Buffalo, NY. (Tracking ID #2192948)

BACKGROUND: Diabetes is among the 10 leading causes of death in the U.S., with Type 2 diabetes representing almost ninety five percent of cases. Effective disease management comprised of medical care, self-management education, and ongoing diabetes support is key to improving quality of life and reducing acute and long-term complications. There is growing evidence that social support in the community is related to better long-term self-management and better health outcomes. We conducted this study to assess the relationship between neighborhood social support and diabetes management in our urban safety-net clinic, hypothesizing that higher perceived neighborhood support would be associated with improved diabetes management.

METHODS: The present report represents initial findings in an ongoing study examining the impact of social support and social resources in the treatment and outcomes of adult patients with type 2 diabetes who live in the city of Buffalo, New York. The Chronic Illness Resource Survey (CIRS) was used to measure support and resources for diabetes management across eight domains including neighborhood social support (NSS). This social support level includes 6 questions probed the amount of support received from patient's neighborhood on a 5-point Likert scale (1: not at all- 5: a great deal). NSS index was created by computing the means of the subscale items. Patients were asked to complete the CIRS survey during their regular appointments to one of our teaching outpatient clinics. Diabetes process and outcomes measures were abstracted from the electronic medical record. Linear and logistic regression analyses were used to model the associations between the NSS and Physician Quality Reporting System outcome and process measures (A1c, microalbuminuria, and ophthalmology visits) adjusting for income, education and self-reported race/ethnicity.

RESULTS: Subject characteristics are shown in Table 1. The average NSS score was 2.6 (SD:0.6). We did not find any statistically significant associations between the NSS and outcome measures. As far as point estimates, there was a slight negative association between A1C and neighborhood social support (β : -0.05, 95 % CI: -0.13, 0.03, p : 0.21). The odds of having an ophthalmology visit (OR: 0.97, 95 % CI: 0.88, 1.05, p : 0.43), and the odds of having microalbuminuria (OR: 0.97, 95 % CI: 0.88, 1.07, p : 0.55) were not associated with NSS.

CONCLUSIONS: Our initial results suggest that there is no strong association between perceived NSS and the selected outcome measures. Future work will

include confirming these findings following study completion, evaluating other aspects of social support, and evaluating more complex relationships between NSS and diabetes outcomes.

VARIABLE	Mean \pm SD	% (n)
Age	58.6 (13.5)	
Sex		
Male		33.7 (33)
Female		66.3 (65)
Race		
White		26.5 (26)
African-American		33.7 (33)
Hispanic		35.7 (35)
Other		4.1 (4)
Language		
English		69.4 (68)
Spanish		29.6 (29)
Others		1 (1)
Marital Status		
Single		41.8 (41)
Married		28.6 (28)
Divorced		8.2 (8)
Separated		3.1 (3)
Others		18.4 (18)
Education		
High school or less		70.4 (69)
Bachelor or more		29.6 (29)
Income		
Under \$10,000		25.8 (25)
\$10,000-29,999		52.6 (51)
\$30,000-49,000		9.3 (9)
Over \$50,000		12.4 (12)
Employment		
Unemployed		15.3 (15)
Employed		24.5 (24)
Retired		30.6 (30)
Unable to work		29.6 (29)
Neighborhood Social Support	2.6 (0.6)	
A1C	7.9 (2.1)	
BMI	32.5 (6.6)	
Microalbuminuria		46.7 (36)
Ophthalmology Visit		27.5 (27)

Sample Characteristics (n=98)

ASSOCIATION BETWEEN SUBJECTIVE SOCIAL STATUS AND CARDIOVASCULAR DISEASE AND CARDIOVASCULAR RISK FACTORS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Karen Tang; Ruksana Rashid; William A. Ghali. University of Calgary, Calgary, AB, Canada. (Tracking ID #2197861)

BACKGROUND: Subjective social status (SSS) is an individual's perception of his own position in the social hierarchy and has been shown to be associated with health outcomes, with lower SSS being associated with worse self-rated and mental health. These health associations may be due in part to its close correlation with objective socioeconomic measures (SES) such as income, education or occupation, though SSS may also exert effects independent of SES. Through internalization of perceptions of inferiority, resulting in activation of stress-related neuroendocrine mechanisms and increased unhealthy behaviors, low SSS may lead also to increased cardiovascular risk. Our objective was to determine the association between lower SSS and odds of coronary artery disease (CAD) and CAD risk factors, including hypertension, diabetes, obesity, and dyslipidemia.

METHODS: We performed a systematic review and meta-analysis. Our search strategy combined the themes “perception” and “social status”, searching PubMed, MEDLINE, EMBASE, CINAHL, PsycINFO, SocINDEX, Web of Science, and reference lists of included studies up to October 2014. Inclusion criteria included: 1) original studies in adults aged 18 years and over; 2) odds, risk, or hazard ratios between “lower” SSS groups and “higher” SSS groups reported for at least one outcome of interest (CAD, hypertension, diabetes, obesity, or dyslipidemia); and 3) SSS is measured on a self-anchoring ladder. Only observational (case-control, cohort, and cross-sectional) study designs were considered. Two reviewers independently assessed studies identified by the search strategy for inclusion into the systematic review. One reviewer extracted data, with a second reviewer corroborating data extraction for 20 % of included studies. Both reviewers independently assessed study quality for all studies. For studies reporting only stratified estimates, a single weighted odds ratio (OR) for each outcome of interest was derived. All ORs were transformed to be expressed per rung decrease on the SSS ladder. Using random-effects models, odds ratios across studies were pooled for each outcome. Stratified analysis and meta-regression were completed for subgroups representing different patient characteristics and study quality criteria. We assessed publication bias through visual inspection of funnel plots, Begg’s test, and through the trim and fill procedure for outcomes where funnel plots suggested visual asymmetry.

RESULTS: Our search strategy identified 7842 citations, 45 of which underwent full-text review, of which ten were included in the systematic review and meta-analysis. Nine studies had a cross-sectional design while one was a prospective cohort study. In analyses adjusted for demographics but not adjusted for objective SES measures, the pooled OR per rung decrease in SSS was 1.06 [95 % confidence interval (CI) 1.01, 1.12] for CAD, 1.06 [95 % CI 1.03, 1.10] for hypertension, 1.07 [95 % CI 1.02, 1.11] for diabetes, 1.14 [95 % CI 1.07, 1.21] for dyslipidemia, and 1.05 [95 % CI 0.99, 1.10] for obesity. The corresponding ORs comparing the bottom versus the top of the ten-rung SSS ladder for CAD, hypertension, diabetes, and dyslipidemia were 1.82 [95 % CI, 1.10, 2.99], 1.77 [95 % CI, 1.29, 2.44], 1.90 [95 % CI, 1.25, 2.87], and 3.68 [95 % CI, 2.03, 6.64] respectively. The associations were attenuated when adjusting for actual SES measures (income, education, and occupation), though all pooled ORs remained greater than 1.0; dyslipidemia was the only outcome to maintain statistical significance with an OR of 1.08 [95 % CI 1.01, 1.15] per rung decrease in SSS, or 2.10 [95 % CI 1.09, 4.06] when comparing the bottom to the top of the SSS ladder. Stratified meta-analysis revealed increased effect sizes for the outcomes of hypertension, diabetes, and obesity for studies with a predominantly Caucasian sample compared with studies without a predominantly Caucasian sample. Better quality studies, with adequate adjustment of non-SES confounders and lower risk of selection bias, reported greater effect sizes compared with lower quality studies. Meta-regression on the same variables did not however result in any significant *p*-values, likely due to being underpowered. There was no evidence of significant publication bias.

CONCLUSIONS: Lower SSS is associated with significantly increased odds of CAD, hypertension, diabetes, and dyslipidemia, and a trend toward increased odds of obesity. Though there is attenuation of these associations when adjusting for income, education, and occupation, the trend remains. Our findings provide further evidence that inequality in the socioeconomic hierarchy may have adverse health effects, not only through objective SES factors and material deprivation, but also through perceptions of social standing. Though there is likely substantial overlap between SES and SSS constructs, they appear to be distinct concepts; further understanding of this complicated relationship and their individual and combined effects on health are needed.

ASSOCIATION OF EATING HABITS WITH WEIGHT LOSS AND DIET SELF-MONITORING IN AN ONLINE WEIGHT LOSS TRIAL: RESULTS FROM THE OCELOT-PC STUDY Bethany Scanlan; Kathleen M. McTigue; Li Wang; Daniel Winger; Molly B. Conroy. University of Pittsburgh, Pittsburgh, PA. (*Tracking ID #2198139*)

BACKGROUND: Traditional, in-person weight loss interventions have emphasized rigorous self-monitoring of daily energy intake to help achieve weight loss. Additionally, studies have shown long-term weight loss and maintenance to be associated with decreased eating in restaurants and snacking, and decreased consumption of fried foods, desserts, sweetened beverages, and high-fat dairy products. With the growth of online resources and interventions, it is important to determine if similar associations are found in the setting of an online weight loss intervention done in coordination with primary care.

METHODS: The Online Counseling to Enable Lifestyle-focused Obesity Counseling in Primary Care (OCELOT-PC) study is an online adaptation of the Diabetes Prevention Program. We recruited 373 primary care patients. Two hundred fifty-seven were randomized to a 12-month structured, online intervention while the remaining patients had access to online group resources (OGR) alone. The online intervention included lessons, weight, diet, and physical activity self-monitoring, and feedback from a coach. Diet self-monitoring was done for both total daily calories and fat grams. Physical measures including weight and diet habits were measured at baseline, 6 months, and 1 year. Diet habits were assessed using a version of the previously validated Connor Diet Habit Survey. This survey provides scores for Meat, Dairy, Fats/Oils, Sweets/Snacks, Grains/Fruits/Vegetables, Beverages, Restaurants, and Seafood. Self-monitoring data was available from intervention participants only and was measured objectively by assessing participant entries into the online program. Changes in diet scores of all participants who achieved $\geq 5\%$ weight loss at 1 year were compared to those that did not achieve 5% weight loss using Mann-Whitney U test. For intervention participants, diet score changes of those who were self-monitoring diet at 1 year were compared to those who were not self-monitoring using Mann-Whitney U test.

RESULTS: Two hundred fifty-four participants had 1 year weight and Connor Diet Habit Survey data available for analysis (mean age 50 years old, 76 % female, 78.1 % white, mean BMI of 37.8 kg/m²), including 166 intervention participants who also had self-monitoring data available. Connor Diet Habit Survey scores at baseline were corresponded to a diet of 30–37 % fat. At 1 year, participants that had $\geq 5\%$ weight loss (*n*=78) had statistically significant greater improvements in their diet scores in Meat (2.8 vs. 1.2; *p*=0.001), Dairy (3.9 vs. 1.9; *p*<0.001), Fats/Oils (4.0 vs. 1.5; *p*<0.001), Sweets/Snacks (1.8 vs. 0.7; *p*=0.005), Beverages (1.0 vs. 0; *p*=0.002), and Restaurants (3.0 vs. 1.0; *p*<0.001), compared to those who lost less than 5 % or gained weight (*n*=176). Intervention participants that did self-monitor diet at 1 year (*n*=35) showed greater improvements in Meat (3.7 vs. 1.7; *p*=0.005), Dairy (4.3 vs. 2.3; *p*=0.04), and Fats/Oils scores (4.0 vs. 2.0; *p*=0.02) at 1 year compared to those that did not self-monitor (*n*=131).

CONCLUSIONS: Weight loss was associated with improvements in various dietary components, corresponding to a reduction in total calories consumed as well as healthier food choices. Additionally, diet self-monitoring was associated with improvements in eating habits, particularly in categories such as meat and dairy where foods tend to be higher in fat. While it is not possible to assess the self-monitoring component of the intervention apart from the other intervention components, our results suggest that online tools to monitor fat and calories may help primary care patients achieve weight loss goals.

ASSOCIATION OF MEDICAL STUDENT EMPATHY WITH CLINICAL COMPETENCE Rachel S. Casas; Lorraine Stanfield; Nanette Harvey; Angela Jackson; Daniel Chen. Boston University School of Medicine, Boston, MA. (*Tracking ID #2180666*)

BACKGROUND: Empathy is a crucial component of physician-patient interactions, and evaluating this skill is integral to medical education. Prior research has shown that empathy scores of medical students are associated with grades in core clerkships but not the Medical College Admissions Test (MCAT) or the United States Medical Licensing Examinations (USMLE) Step exams. Additionally, prior studies have shown conflicting associations between empathy scores and Objective Structured Clinical Examinations (OSCEs). No prior studies have evaluated all of these measures of clinical competence in the same cohort of students or evaluated if empathy scores early in medical school are predictive of later clinical performance. We hypothesized that empathy scores would be positively associated with OSCE and core clerkship performance but not standardized test scores.

METHODS: This longitudinal, cohort study compared clinical competence and empathy scores of 265 first year and 590 third year medical students enrolled at the Boston University School of Medicine from 2007 through 2010. Self-reported empathy scores were collected through the Jefferson Scale of Physician Empathy (JSPE) - Student Version, a validated, 20-item tool with higher scores corresponding to higher empathy (score range 20 to 140). Measures of clinical competence included grades from core third year clinical clerkships, third year OSCEs, and national standardized tests (MCAT and USMLE Step exams 1, 2 CS, and 2 CK). Data analysis was completed with JSPE score as a predictor for categorical outcomes using logistic regression and for continuous outcomes using linear regression. The associations between JSPE scores and grades were also evaluated with multiple regression analysis to control for demographic variables.

RESULTS: First year medical students were of median (IQR) age 23 (3) years, had a median (IQR) empathy score of 117 (15), and were 53 % percent female. Empathy scores of medical students in their third year were associated with higher performance in OSCEs and lower performance on Step 1, but were not associated with other standardized test or core clerkship grades. The relationship between third year empathy and OSCE score remained significant when controlling for age, gender, debt, and future career interest. Empathy scores in the first year of medical school were negatively associated with MCAT scores and not predictive of OSCE, Step 1, or Step 2 CK scores. The relationship between first year empathy and MCAT scores did not remain significant when controlling for demographic factors. Regression analysis for first year empathy scores and Step 2 CS or clinical clerkships could not be completed due to the limited number of students who failed these evaluations.

CONCLUSIONS: Self-reported empathy scores in the third year of medical school are associated with higher performance on OSCEs but not standardized tests or clinical clerkship grades. Further research is needed to determine if tools like the JSPE are useful in identifying medical students needing early intervention to improve communication skills.

ASSOCIATION OF PHYSICIANS' FINANCIAL RELATIONSHIPS WITH PHARMACEUTICAL COMPANIES AND THEIR LIPID-LOWERING MEDICATION PRESCRIBING PATTERNS James S. Yeh^{1,2}; Jessica M. Franklin^{1,2}; Jerry Avorn^{1,2}; Joan Landon^{1,2}; Aaron Kesselheim^{1,2}. ¹Brigham and Women's Hospital, Boston, MA; ²Harvard Medical School, Boston, MA. (Tracking ID #2196307)

BACKGROUND: Physicians' financial relationships with pharmaceutical companies have long been controversial. These relationships can consist of receipt of industry-sponsored meals, money for continuing medical education (CME) activities, reimbursements for consulting and participation on speaking bureaus, grants, and payments for education and training. Numerous small studies and surveys suggest that these financial relationships affect prescribing practices, but many physicians and policymakers remain unconvinced. Using a comprehensive Massachusetts medical conflicts of interest database and a prescription claims database, we sought to evaluate the association between physicians' financial relationships and their prescribing of brand-name versus generic cholesterol-lowering medications.

METHODS: We manually linked Medicare prescription claims data prepared by the Centers for Medicare and Medicaid Services relating to Massachusetts physicians with the Massachusetts physician open-payment database from 2011. The exposure variable was the listing of physicians' financial relationship and outcome measurement was physicians' prescribing of any brand-name-only cholesterol-lowering medication. The analysis was limited to physicians who had at least 50 claims of a particular drug. We used chi-square and ANOVA tests to analyze the association between the intensity of physician-industry relationships (determined by monetary value of payments) and physicians' prescribing practices. We used logistic regression model to determine the relationship between the types of physician-industry relationships and their brand-name prescribing behavior.

RESULTS: Our analysis included 2444 physicians. Approximately one-third (899, 37 %) had some sort of financial relationship with a pharmaceutical company, while 63 % (1546) had no industry payments in 2011. The most common payment type was for company-sponsored meals (639, 71 %), followed by grants (458, 51 %), consulting and speaking bureau (236, 26 %), and educational training grants (95, 11 %). Compared to physicians without pharmaceutical company payments, physicians in the top quartile of total value of payments (>\$1188) had higher rates of brand-name cholesterol-lowering medication prescriptions (21 % versus 18 %, $p<0.01$). When physicians were categorized by quartiles based on their rates of brand-name prescribing, there was a significant positive relationship between the average total monetary value of drug company payments (\$3696, \$1419, \$701, and \$542, $p<0.01$) and brand-name prescribing percentage (39 %, 19 %, 10 %, and 4 %, $p<0.01$), respectively. Among physicians who received pharmaceutical company payments, educational training payments were significantly associated with increased brand-name prescribing (18 % versus 22 %, $p<0.01$), but the other payment types were not.

CONCLUSIONS: Physicians who have financial relationships with pharmaceutical companies have higher brand-name cholesterol-lowering medication prescribing than physicians who do not have such relationships. The rate of brand-name prescribing was associated with the intensity of physician-industry relationships measured by the total value of monetary payments. The receipt of educational training payments may be a significant predictor of brand-name prescribing. The study findings only apply to physicians prescribing substantial numbers of cholesterol-lowering medication each year and may be limited by the integrity of pharmaceutical companies' self-reporting of physician payments.

ASSOCIATION OF THE BUILT ENVIRONMENT AND NEIGHBORHOOD RESOURCES WITH OBESITY-RELATED HEALTH BEHAVIOR Natalie N. Albanese¹; Jennifer P. Friedberg^{1,3}; Andrew Rundle⁴; James Quinn⁴; Kathryn Neckerman⁴; Stuart R. Lipsitz²; Sundar Natarajan^{3,1}. ¹New York University Medical Center, New York, NY; ²Northwestern University, Boston, MA; ³VA New York Harbor Healthcare System, New York, NY; ⁴Columbia University, New York, NY. (Tracking ID #2199242)

BACKGROUND: The neighborhood may influence obesity-related health behaviors. In this project, we evaluated associations between neighborhood characteristics and physical activity, dietary intake, and body mass index (BMI) in high-risk patients with uncontrolled hypertension.

METHODS: Person-level data were collected at baseline from 533 veterans with uncontrolled hypertension participating in a randomized controlled trial. The two neighborhood measures were census tract level Walkability, measured using built environment features that promote walking (components were z-scored and summed to create tertiles), and healthy food proximity (HFP), a 0–100 score reflecting proximity of grocery stores and farmers' markets. The exercise outcomes were: number of hours of exercise per week (continuous), assessed using the 7-day Physical Activity Recall (PAR); exercise adherence (dichotomous), designated as aerobic activity ≥ 3 days/week from PAR; and Stage of Change (SOC) for exercise (dichotomous), using valid measures. The diet outcomes were: adherence to saturated fat and total fat intake recommendations (continuous), measured by an adherence index (0–10) with 10 being maximal adherence using the Willett Food Frequency Questionnaire (FFQ); and Stage of Change (SOC) for DASH diet (dichotomous). The obesity measure was BMI. Robust or logistic regression (adjusting for age, race, education) clustered by provider were used to evaluate the association between the neighborhood measures (Walkability and HFP) and the exercise, diet, or BMI outcomes.

RESULTS: There was a positive association between Walkability and increased adherence to dietary recommendations for fat intake; for each tertile increase in Walkability, there was a 1.02-point increase in the saturated fat adherence index (95 % CI: 0.03, 2.02, $p=.04$) and a 0.84-point increase in the total fat adherence index (95 % CI: 0.23, 1.44, $p=.007$). Patients in the highest Walkability tertile were also 75 % more likely to be in the Action or Maintenance SOC for exercise than those in the lowest Walkability tertile (OR 1.75, 95 % CI: 1.14, 2.69, $p=.01$). Walkability was negatively associated with BMI, with each tertile increase in Walkability being associated with 1.13 decrease in BMI (95 % CI: -2.04, -0.23, $p=.01$). HFP was positively associated with increased exercise duration, with each point increase in HFP being associated with 0.63 additional hours of exercise (95 % CI: 0.047, 1.22, $p=.03$). Patients in the highest HFP tertile were also 66 % more likely to be adherent to exercise recommendations (OR 1.66, 95 % CI: 1.01, 2.75, $p=.05$), and 67 % more likely to be in Action or Maintenance SOC for exercise (OR 1.67, 95 % CI: 1.10, 2.52, $p=.01$) compared to those in the lowest HFP tertile. There was also a positive trend between HFP and increased dietary adherence to saturated fat, such that each point increase in HFP was associated with a 0.84 increase in saturated fat adherence index (95 % confidence interval [CI]: -0.11, 1.79, $p=.08$). There were no significant associations between neighborhood measures and SOC for DASH diet.

CONCLUSIONS: Neighborhood is associated with people's eating and exercise habits. Environmentally-tailored health recommendations and interventions may lead to healthier lifestyles and potentially decrease obesity rates.

ASSOCIATIONS BETWEEN MENTAL HEALTH BURDEN, SMOKING AND CARDIOVASCULAR DISEASE IN WOMEN VETERANS OVER 45 Megan R. Gerber^{1,4}; Matthew King^{3,4}; Suzanne Pineles^{3,4}; Katherine Iverson^{3,4}; Sally G. Haskell². ¹Boston University, Jamaica Plain, MA; ²Yale University, VA CT; and VA Central Office, Madison, CT; ³VA Boston Healthcare System, Jamaica Plain, MA; ⁴Boston University School of Medicine, Boston, MA. (Tracking ID #2198075)

BACKGROUND: Understanding the health and health care needs of aging Veterans is a key priority of the Veterans Health Administration (VHA). Currently, women Veterans (WV) aged 45–64 represent the highest proportion of female VHA users. WV experience significant mental health (MH) burden. MH and race are known risk factors for cardiovascular disease (CVD), but the impact of increasing MH burden on CVD for WV has not been described. Our study aims were to 1) determine which MH conditions have the strongest association with CV disease, and 2) quantify the impact of increasing MH burden on CV disease in WV over age 45. A secondary aim was to report smoking prevalence in this group.

METHODS: VHA National Patient Care Data (2009) were used to identify women Veterans over age 45. ICD-9-CM codes were used to categorize medical and psychiatric conditions. MH diagnoses examined were: alcohol and drug use, psychotic, bipolar, depressive, anxiety, somatization, eating disorders and PTSD. Smoking data was culled

from clinical reminder data. We used stepwise logistic regression (LR) modeling to identify MH predictors of CVD, adjusting for age, race and smoking. Analyses were conducted using R statistical software.

RESULTS: One hundred fifty-seven thousand one hundred ninety-five WV were identified, their mean age was 59.4 years (SD 12.2, range 46–110). The majority (61 %) of the sample was white. Thirty-six percent reported current smoking and 19 % were past smokers. The majority of WV (69 %) had no mental health diagnosis, 18 % had one, and 12 % carried two or more. Logistic regression analyses (Table) demonstrated that depression, anxiety and psychotic disorder were the strongest mental health predictors of CVD.

CONCLUSIONS: Controlling for age, race and current smoking, each MH diagnosis increased CVD odds by 54 % in WV over age 45. Depression had the strongest association with CV disease, with higher odds than those for smoking. Tobacco use is prevalent among women Veterans over 45; a strength of this study was use of clinically-derived smoking data. The study findings are limited, however, by lack of information on psychiatric medication. In summary, interventions to reduce CVD among older WV must take into account MH comorbidity, and efforts at addressing smoking cessation in this population are critical. With its primary care-mental health integration model, VHA is well-positioned to improve medical outcomes for WV with MH comorbidity. To optimize the health of older WV with co-morbid MH conditions, future trials of multidisciplinary interventions to reduce CVD risk and smoking are warranted.

Adjusted stepwise logistic regression: diagnoses associated with CV disease

MODEL 1

Control variables (% sample)	OR [95 % CI]
Age	1.06 [1.06, 1.06]
Race Black (25 %)	1.02 [0.95, 1.10]
Race Hispanic (6 %)	0.54 [0.45, 0.63]
Current smoker (36 %)	1.61 [1.51, 1.71]
Past smoker (19 %)	1.15 [1.08, 1.23]

MH Diagnoses

Depression (21 %)	1.82 [1.71, 1.94]
Anxiety (7 %)	1.30 [1.18, 1.42]
Psychotic Disorder (5 %)	1.30 [1.18, 1.43]

MODEL 2 *

MH diagnosis count (0–3)	1.54 [1.48, 1.60]
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* Adjusted for age, race, smoking, substituted MH diagnosis count for individual diagnoses.

ASSOCIATIONS BETWEEN SOCIAL MEDIA USE AND DEPRESSIVE SYMPTOMS AMONG US YOUNG ADULTS Liu yi Lin²; Ariel Shensa²; Jason Colditz²; Ana Radovic³; Elizabeth Miller¹; Beth Hoffman²; Brian A. Primack². ¹Children's Hospital of Pittsburgh of UPMC, Pittsburgh, PA; ²University of Pittsburgh, Pittsburgh, PA; ³Children's Hospital of Pittsburgh, Pittsburgh, PA. (Tracking ID #2198215)

BACKGROUND: Over the last decade, use of social networking sites (SNSs) such as Facebook have and revolutionized the way people interact and communicate. Nearly all (90 %) of young adults use SNSs, and the majority of users visit these sites at least once daily. The association between social media use and depression is unclear. Some studies suggest that social media users may experience an increase in social connectedness and a related decrease in emotional health problems. Other studies, however, suggest that frequent use of social media may be associated with declines in subjective well-being, life satisfaction, and real-life social community. Prior studies have been limited by use of small, localized samples. In addition, they have tended to focus on one specific platform, Facebook, while real-life usage, especially among young adults, has broadened to include use of multiple other platforms such as Twitter, Google+, Instagram, Tumblr, Snapchat, and Vine. Therefore, the purpose of our study was to determine independent associations between social media use across multiple platforms and depressive symptoms in a large, nationally-representative sample of young adults.

METHODS: We surveyed a nationally-representative sample of the US population between the ages of 18 to 30 regarding social media use and depressive symptoms. We recruited participants via random-digit-dialing and address-based sampling frames representing over 97 % of the US population. Participants responded to online surveys over a 1-month period in October–November of 2014. We assessed our independent variable, social media use, in three different ways, including self-reported total time spent with online social networks per day, average number of social network site visits per week, and responses on a global frequency scale that was adopted from the Pew Internet Research Questionnaire. Each of these latter two scales prompted participants regarding the most commonly used 11 SNSs and combined response data. Our primary dependent

variable was depressive symptoms as measured by the brief Patient-Reported Outcomes Measurement Information System (PROMIS) depression scale. The scale consisted of 4 items, each of which was assessed on a 5-point Likert scale. Based upon the distribution of data, scale values were collapsed into tertiles for primary analyses. We used ordered logistic regression with sample weights to assess multivariable associations between SNS use and depression and while controlling for relevant socio-demographic, personal and environmental factors. We developed separate models for each of the methods of assessing the independent variable (SNS use). All ordered logistic regression models satisfied the required proportional odds assumption.

RESULTS: Our sample of 1781 participants was 61.8 % female, 64.1 % Caucasian, 10.0 % African American, 16.6 % Hispanic and 9.3 % of mixed or other race. Our primary fully-adjusted multivariable models included all covariates, including age, sex, race and ethnicity, relationship status, living situation, household income, and education level. These analyses demonstrated that, compared to those in the lowest quartile for total time on SNS use per day, participants in the highest quartile had increased odds of having greater depressive symptoms (AOR=1.66, 95 % CI=1.14, 2.42). Results were also significant for each of the other independent variables. In particular, compared with those in the lowest quartiles, those in the highest quartiles of SNSs visits per week (AOR=2.74, 95 % CI=1.86, 4.04) and the global frequency scale (AOR=3.05, 95 % CI=2.03, 4.59) reported greater depressive symptoms. All associations between independent variables and depressive symptoms demonstrated strong, linear, dose-response trends ($P<.001$ for all). Results were robust to all sensitivity analyses.

CONCLUSIONS: Regardless of the particular method of operationalizing the variable of SNS use, we found a strong, linear, and significant association between SNS use and depressive symptoms, even after controlling for multiple relevant socio-demographic variables. Importantly, the cross-sectional design of this study inhibits our ability to infer directionality of this association. For example, while it could be that depressed individuals seek out social networking sites, it may also be that those who frequent social networking sites develop depressive symptoms. Other researchers have suggested that this latter explanation may result from frequent exposure to idealized, non-realistic images and messages from “friends” to which end-users may feel inferior. Longitudinal studies may help to tease out this directionality. Regardless of directionality, however, this study highlights an important association, especially given the increasing prevalence of SNS use and the substantial morbidity associated with depression. It also suggests that it may be valuable to use SNSs to identify individuals at risk for mood disorders.

ASSOCIATIONS BETWEEN SOCIAL MEDIA USE AND EATING DISORDER RISK AMONG US YOUNG ADULTS Jaime Sidani; Ariel Shensa; Mercy Baffour; Beth Hoffman; Brian A. Primack. University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2198304)

BACKGROUND: Eating disorders represent a growing public health concern, especially among female young adults in developed nations. Prevalence estimates in the U.S. are approximately 0.8 % for anorexia nervosa (AN), 2.6 % for bulimia nervosa (BN), 3 % for binge eating disorder (BED), and 11.5 % for Feeding or Eating Disorder Not Elsewhere Classified (FEDNEC). Although the etiology of eating disorders is multi-factorial, exposure to media portrayals of idealized bodies is considered to be a significant contributor. While traditional media, such as television and magazines, have been examined extensively in relation to eating disorder risk, the influence of social media has received relatively less attention. Considering the proliferation of social media platforms and their popularity with the young adult population, investigation into their potential association with eating disorders should be examined. Therefore, we conducted a large scale, nationally representative study to assess associations between social media use and eating disorder risk among US young adults.

METHODS: We collected web-administered survey data from 1765 young adults who were part of a national probability-based online non-volunteer access panel randomly selected to participate in a study of health behaviors. For this study, we developed a composite 5-item eating disorder risk scale with items adapted for this population from two validated measures: the SCOFF Questionnaire and the Eating Disorder Screen for Primary Care (ESP). Each item was assessed on a 5-point Likert scale. We performed a factor analysis to assess the underlying structure of these items. The total scale ranged from 0 to 25 with higher numbers indicating greater eating disorder risk. Based on the distribution of this variable, eating disorder risk was subsequently collapsed into quartiles for analyses. Participants' social media use was assessed in three ways. First, participants were asked to self-report total time per day using social media. Second, we estimated total average social media visits per week based on responses to self-report items. Finally, we used a global frequency scale based on a Pew Internet Research item which assessed use of each of the most commonly used 11 social media platforms. To assess independent associations between social media use and eating disorder risk, we used ordered logistic regression while controlling for socio-demographic variables including age, sex,

race/ethnicity, relationship status, living situation, household income, and maternal education.

RESULTS: Our sample was 62 % female, 64 % Caucasian non-Hispanic, 10 % African-American non-Hispanic, 17 % Hispanic, and 9 % of mixed or other race. Factor analysis suggested that the 5 eating disorder risk items represented one underlying construct. These items were also internally consistent (Cronbach's $\alpha=0.81$). Results from fully-adjusted multivariable ordered logistic regression models indicated that increased social media use was significantly associated with increased odds of greater eating disorder risk. This was true for each of the 3 different methods of measuring social media use. In particular, compared with those in the lowest quartile, those in the highest quartile for each social media use variable had significantly greater odds of having increased eating disorder symptoms, with AORs of 2.05 (95 % CI=1.43, 2.94) for total minutes per day, 2.75 (95 % CI=1.89, 4.02) for average visits per week, and 3.39 (95 % CI=2.34, 4.91) for the global frequency scale. As required for ordered logistic regression, the proportional odds assumption was met for each model.

CONCLUSIONS: These findings suggest that individuals with greater use of social media are at greater odds of being at increased risk for eating disorders, even when controlling for multiple relevant socio-demographic variables. Second, these associations were consistent regardless of how social media use was measured, suggesting robustness of findings. However, it is noteworthy that these cross-sectional data cannot disentangle directionality. In particular, while it may be that individuals with eating problems seek out information on social media, it may also be that those exposed to social media subsequently develop eating concerns. Future longitudinal examinations will be helpful to determine directionality of these associations. In either case, however, it is useful to know that social media may be a particularly valuable medium to reach individuals at risk for eating disorders.

ASSOCIATIONS BETWEEN SOCIAL MEDIA USE AND PERCEIVED EMOTIONAL SUPPORT AMONG A NATIONALLY-REPRESENTATIVE COHORT OF YOUNG ADULTS Ariel Shensa¹; Jaime Sidani¹; Jason Colditz²; Zhongying Xu¹; Kaleab Abebe¹; Liu yi Lin²; Brian A. Primack¹. ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh School of Medicine, Pittsburgh, PA. (Tracking ID #2198738)

BACKGROUND: Decreased emotional support has been associated with poor physical health, poor mental health, and increased mortality. With the explosion of Internet and social media use, opportunities for connectedness and support have become more complex. From 2005 to 2013, the percent of adults ages 18–29 who use social media increased from 9 to 90 %, with over 74 % of all online adults now reporting some social media use. Leveraging this ubiquitous medium may be helpful in increasing opportunities for emotional support related to health conditions. For example, social media platforms may help connect people with shared conditions, facilitating support groups and sharing of information. However, it is not known whether overall social media use is associated with increased emotional support for a general population of users. Therefore, the purpose of this study was to assess associations between social media use and perceived emotional support in a large, nationally-representative population.

METHODS: We collected survey data from a nationally-representative sample of 1796 young adults ages 18–30 recruited via random-digit-dialing and address-based sampling methods from October to November 2014. We assessed our independent variable, social media use, in three different ways, including self-reported total time spent with online social networks per day, average number of social network site visits per week, and responses on a global frequency scale adopted from the Pew Internet Research Questionnaire. Each of these latter two scales prompted participants regarding the most commonly used 11 social networking sites (e.g., Facebook, Twitter, Instagram, Tumblr, and Reddit) and combined response data. Our primary dependent variable was emotional support as measured by the brief Patient-Reported Outcomes Measurement Information System (PROMIS) emotional support scale. The scale consisted of 4 items, each of which was assessed on a 5-point Likert scale. Based upon the distribution of data, scale values were dichotomized into those with low vs. high emotional support. Subsequently, we used logistic regression with sampling weights to assess multivariable associations between social media use and emotional support. Our primary models controlled for all relevant socio-demographic variables, including age, sex, race and ethnicity, relationship status, living situation, household income, and education level.

RESULTS: Our sample of 1785 individuals was 62 % female, 64 % Caucasian and non-Hispanic, 10 % African-American and non-Hispanic, 17 % Hispanic,

and 9 % of mixed or other race. Just over half (58 %) of respondents reported being in a committed relationship and 41 % reported that they lived with a significant other. A multivariable model including all measured covariates demonstrated that being in the highest quartile of total minutes per day of social media use was significantly associated with decreased odds of having high perceived emotional support (AOR=0.62, 95 % CI=0.40, 0.94). A second fully adjusted model demonstrated that being in the highest quartile of social media use on the global frequency scale was also significantly associated with decreased odds of having high perceived emotional support (AOR=0.60, 95 % CI=0.38, 0.94). However, being in the highest quartile for social media visits per day was not significantly associated with decreased odds of having high perceived emotional support (AOR=0.70, 95 % CI=0.45, 1.09), although the point estimate was below 1. Tests for trend demonstrated significant linear dose–response relationships for independent variables of total social media time ($P=.019$) and the global frequency scale ($P=.011$), but not for the number of visits per week ($P=.17$).

CONCLUSIONS: Participants in the highest quartiles of two different social media use frequency measures had significantly decreased odds of reporting higher levels of perceived emotional support. A third independent variable, which quantified social media visits per week, was associated with a lower point estimate for perceived emotional support but was non-significant. These results suggest that, while we might expect individuals who engage in frequent social media to feel more emotional support, it seems that heavy users may actually feel less emotional support. However, it should be emphasized that the cross-sectional nature of these data hinders our ability to infer directionality. In particular, while it may be that individuals with low emotional support tend to increase their social media use to compensate, it may also be that individuals who start to use increased social media ultimately feel less true emotional support and connection. Longitudinal analyses may help assess directionality of these findings. In either case, however, these findings are notable not only because of known associations between low emotional support and poor health outcomes but also because of the rapid rise in social media use among nearly all US adults.

AST: A SIMPLIFIED TOOL FOR MANAGING ALCOHOL WITHDRAWAL Samuel B. Holzman; Darius Rastegar. Johns Hopkins University, Baltimore, MD. (Tracking ID #2148096)

BACKGROUND: Alcohol withdrawal syndrome (AWS) is a common and potentially serious medical problem. The standard of care is symptom-triggered dosing of benzodiazepines. The “gold standard” for monitoring withdrawal is the Revised Clinical Institute Withdrawal Assessment Scale (CIWA-Ar), which is a 10-item scale that can take up to 5 min to complete. There have been efforts to develop simpler scales; a recent one is the Glasgow Modified Alcohol Withdrawal Scale (GMAWS), a 5-item scale reported to perform well in a previous report.

METHODS: This project took place in the Johns Hopkins Bayview Medical Center Chemical Dependence Unit in Baltimore, Maryland. Initially, the GMAWS was piloted and compared with CIWA-Ar. Based on initial evaluation of the GMAWS and nursing feedback, the “Anxiety Sweats Tremor” scale (AST) was developed by removing 2 of the 5 items that were rarely used and expanding the scoring range from 0–2 to 0–3. The AST was then piloted and compared with simultaneous CIWA-Ar scores. Internal consistency of each test was measured by Cronbach's alpha and the adequacy of AST in predicting CIWA-Ar ≥ 8 (the cutoff for treatment) was assessed by Receiver Operator Characteristics (ROC) curve.

RESULTS: In the initial phase, the mean CIWA-Ar score was 5.3 and GMAWS 2.0. The internal consistency of CIWA-Ar and GMAWS were both poor, with Cronbach's alpha scores of 0.46 ($N=156$) and 0.41 ($N=156$) respectively. The internal consistency of our modified AST scale was significantly better with a Cronbach's alpha of 0.68 ($N=176$) and good corrected item-total correlation (>0.4 for all components). AST was effective in identifying individuals with CIWA-Ar ≥ 8 with an area under the ROC curve (AUC) of 0.83 (95 % CI 0.77–0.89), compared to 0.8 (95 % CI 0.74–0.88) seen with GMAWS. An AST score of ≥ 3 (out of a possible 9) predicted CIWA-Ar ≥ 8 with a sensitivity of 93 % and specificity of 63 %, while the GMAWS operated with a sensitivity and specificity of 98 and 39 %, respectively, based on previously defined cutoffs.

CONCLUSIONS: Our simplified scale, AST, easily remembered by the transaminase elevated in acute alcoholic hepatitis, measures withdrawal based on three domains: anxiety, sweat and tremor. Overall, the scale performed well, demonstrating good internal consistency and reliably identified individuals experiencing significant withdrawal based on CIWA-Ar scores. Its operating characteristics were at least as good as GMAWS, with an improved specificity, and benefited from a simpler and more streamlined design.

Table 1. Comparison of Alcohol Withdrawal Scales

	CIWA	GMAWS	AST
Number of observations	156	156	176
Number of items	10	5	3
Range for each item	0–7*	0–2	0–3
Maximum score	67	10	9
Score triggering drug administration	≥8	≥1 ¹	≥3 ²
Sensitivity	–	98 %	93 %
Specificity	–	39 %	63 %
Mean score (SD)	5.3 (2.6)	2.0 (1.0)	2.9 (1.7)
Range	0–13	0–5	0–7
Cronbach's alpha	0.46	0.41	0.68

CIWA=Revised Clinical Institute Withdrawal Assessment Scale

GMAWS=Glasgow Modified Alcohol Withdrawal Scale

AST=Anxiety, Sweat, Tremor

*One item is scored 0–4.

1 As defined by Daepfen et al. 2002 and McPherson et al. 2012 2 Proposed based on study results

2 Proposed based on study results

ATTITUDES ABOUT LUNG CANCER SCREENING AMONG PRIMARY CARE PROVIDERS Dhvani Doshi; Alexandra Rosenberg; Juan P. Wisnivesky; Jenny Lin. Icahn School of Medicine at Mount Sinai, New York City, NY. (Tracking ID #2196761)

BACKGROUND: Lung cancer screening has been shown to reduce lung cancer mortality among high risk smokers but is also associated with many false positives results which may trigger lengthy and invasive evaluations. Primary care providers (PCPs) will be responsible for implementing current recommendations for screening. However, there is limited information regarding their attitudes about lung cancer screening.

METHODS: PCPs practicing at an academic hospital in New York City were surveyed anonymously about their knowledge of and attitudes toward lung cancer screening guidelines and the likelihood they would recommend lung cancer screening to their patients. The survey items were developed based on findings of a multidisciplinary focus group. Descriptive and univariate analyses were used to assess differences in attitudes about lung cancer screening between PCPs who reported they would be likely to order screening CT scans vs. those who would not be likely to screen.

RESULTS: A total of 69 surveys were completed. Of the respondents, 40 % were attendings, and 67 % were female. Almost all PCPs were familiar or very familiar with USPSTF guidelines for breast cancer (99 %), cervical cancer (94 %), or colon cancer (99 %) screening compared with only 53 % reporting familiarity with lung cancer screening guidelines. Most PCPs reported ordering breast, cervical, and colon cancer screening tests for >75 % of their eligible patients compared to ordering CT screening for <25 % of their eligible smokers. Three-quarters (81 %) of PCPs were concerned about not being able to order chest CTs due to insurance reasons, 48 % were concerned about the overall healthcare dollars associated with screening, but only 9 % felt that lung cancer screening was not cost effective. Only 28 % of PCPs believe that the recommended yearly screening interval is feasible and less than 15 % felt they have sufficient time to counsel patients about CT scan screening. An overwhelming majority (≥90 %) worried about incidental findings associated with CT screening or about the number of follow up procedures resulting from positive results, and all (100 %) believed that positive screening results can cause distress to patients. Most PCPs (64 %) were confused about how to apply lung cancer screening guidelines for patients with multiple comorbidities and only half (52 %) felt confident in their abilities to decide on the workup of patients with positive CT findings. PCPs who reported they would be very likely to order a screening CT scan in the next year for their high-risk smokers were more likely to be familiar or very familiar with screening guidelines (91 % vs. 46 %, $p=0.01$), to be confident in their ability to decide on the workup of patients with positive CT findings (82 % vs. 47 %, $p=0.03$), and to state that they were able to identify the appropriate patients for lung cancer screening (100 % vs. 56 %, $p=0.01$).

CONCLUSIONS: While most PCPs agree that lung cancer screening with low-dose CT scans for high risk smokers is cost effective, many are still not familiar with the USPSTF lung cancer screening guidelines. Multiple barriers such as concerns about insurance coverage, frequency of recommended screening intervals, time needed for counseling patients and concerns about consequences of positive screening results may limit PCPs

from ordering screening chest CTs. PCPs clearly need further education and support to improve lung cancer screening.

BARRIERS TO GREATER CIVIC ENGAGEMENT AMONG PHYSICIANS James M. Kuo; Tara F. Bishop. Weill Cornell Medical College, New York, NY. (Tracking ID #2194095)

BACKGROUND: Professional organizations, scholars, and leaders argue that it is a privilege and responsibility for physicians to be active members of their communities through civic engagement to influence the social determinants of health and increase public trust in the medical profession. However, a survey of US physicians found that 95 % rated community participation as important but only 54 % volunteered and 26 % participated in political involvement other than voting. Additionally, when controlling for socioeconomic factors, physicians are less likely to vote and volunteer than the general population. The objective of this study was to explore the types of civic activities physicians engage in and the barriers to and facilitators for physician participation.

METHODS: We performed a qualitative telephone interview study of physicians practicing in the community from a convenience sample through personal contacts. Our sample was limited to physicians who had completed training and provide at least 20 h per week of patient care. We used a semi-structured interview tool that focused on five topic areas: 1) definition and knowledge of civic engagement, 2) experience with civic engagement 3) reasons for not engaging in civic activities, 4) reasons for engagement in civic activities, and 5) views on civic engagement and professionalism. Transcripts were analyzed using the constant comparison method.

RESULTS: We interviewed 10 physicians and intend to interview 10 to 15 more. Participants to date were from 7 specialties and 6 states. Most viewed civic engagement as some combination of voting, volunteering, and advocacy. All viewed civic engagement favorably, but most saw it as something to be encouraged but not required. Interviewees participated in a variety of activities including advocating for healthcare issues, volunteering in the community, and donating money. Those who saw Medicaid or uninsured patients viewed these activities as a form of service. The most common barrier to greater participation was lack of time. Interviewees also stated that money was a factor and could not justify non-reimbursable activities. Some felt that they had inadequate training or expertise in advocacy or that their views were not valued by society. There was a significant group of interviewees who felt that seeing patients fulfilled any responsibility for civic engagement. One respondent felt that their compassion and empathy had already been consumed by her patients and that there was nothing left to give to their communities. A respondent cited liability fear while another cited fear of retaliation for advocating for reproductive rights. Facilitators of engagement included having a more established practice of patients and concomitantly working less hours.

CONCLUSIONS: In this qualitative study, we found that time and money were the most common reasons that physicians do not engage in civic activities. The nature of our study limits generalizability, but greater insight into physician views on civic engagement will allow the medical community to combat barriers to involvement to contribute to a more active and engaged populace of physicians that is better able to improve the health of their patients beyond the walls of the clinic.

BARRIERS TO PATIENT EMPOWERMENT AND SHARED DECISION-MAKING (SDM): HEALTHCARE PROVIDER (HCP) PERSPECTIVES Sarita Kundrod²; Joseph Plaksin²; Andrew B. Wallach¹; Sondra Zabar²; Lisa Altshuler²; Adina Kalet². ¹Bellevue Hospital, New York, NY; ²NYU School of Medicine, New York, NY. (Tracking ID #2198543)

BACKGROUND: Participation in shared decision-making (SDM) requires patients to ask questions, effectively communicate their values and preferences to healthcare providers (HCPs), and collaborate with HCPs to make medical decisions. Despite its benefits, many patients do not take a more active role in SDM because of desires to be a “good patient” and the difference in knowledge and power between patients and HCPs. We aim to develop a Patient Empowerment Program (PEP) that will address these barriers and allow patients to fully participate in SDM. However, the potential benefits of PEP could be limited by barriers to SDM from the HCP perspective, such as time constraints and misconceptions about patients' ability or willingness to participate in SDM. To examine how to overcome these potential barriers, we conducted a qualitative study to explore HCP 1) experiences with patients who have varying levels of empowerment, 2) opinions on the role of patients and HCPs in SDM, and 3) approaches to treating patients who are highly empowered.

METHODS: Internal Medicine faculty at two NYC public hospitals, NYU Primary Care residents, and 3rd-4th year NYU medical students with at least 1 year of experience on clinical rotations were invited via email to attend focus groups. The same interview

questions were asked at all levels of training and medical students were also asked about how their views had changed over the course of their core clinical rotations. All sessions were audio-recorded and transcribed by a professional company. Two independent coders reviewed one segmented transcript to develop a coding schema, then met to negotiate a finalized set of codes that were applied to the remaining transcripts. Dedoose software was used to assist with coding and thematic analysis.

RESULTS: A total of 38 participants attended the focus groups: 11 faculty, 16 residents, and 11 medical students. In order to protect the anonymity of participants, no demographic data was collected. Thematic analyses focus on characteristics of the ideal and difficult patient, the role of the HCP in SDM, and barriers to patient activation in the medical encounter. Across all levels of training, ideal patients were described as those who are prepared for their appointments and were knowledgeable about medical conditions, allowing the HCP to “focus on their medical issues...and also see progress” as well as those who “actually make efforts to participate in their care.” HCPs generally supported the idea of a PEP that helped patients achieve these goals. Difficult patients could be split into two broad categories. The first included patients who are non-English speaking or who HCPs perceive as not being empowered, such as those with poor social supports, serious psychological illnesses, or whose attitudes get in the way of their care, such as patients who perceive themselves as “victims: where everything bad that’s happening to them is because it’s somebody else’s fault.” The second category of difficult patients shares some characteristics with empowered patients; they believe they have a significant role in their care but they do not seem to value the knowledge and expertise of HCPs. Faculty and residents describe these patients as being entitled or “people who think they just walked into McDonald’s and they know what’s on the menu and they’re going to order it...they don’t really want to have any advice from [the HCP].” Medical students describe difficult patients who “have the information [about their labs or test results] but not what these values mean and then [they] make really incorrect assumptions” that are hard to dispel later. When discussing the role of the HCP in SDM, both faculty and residents believe that they “do many things that are not in their job description [in order to] get the patient’s health a little better.” Medical students echoed this sentiment, but were more surprised, saying “I didn’t think that physicians would even have to necessarily deal with all of this extra stuff,” which includes coordinating appointments and dealing with patients’ social issues. Systemic barriers to SDM included lack of time, difficulties navigating the system, and taking on additional roles due to limited support staff or limited trust in support staff.

CONCLUSIONS: HCPs across all levels of training considered more empowered patients ideal compared to less empowered patients. But they described patients who are “entitled” or have “too high of expectations” as difficult as well. These perspectives support the need for a PEP that helps equalize the power differential between HCPs and patients, while still valuing HCP expertise. HCPs also highlighted a number of systemic barriers that must be addressed, in addition to both HCP and patient barriers, in order to support opportunities for SDM.

BARRIERS TO PRIMARY ADHERENCE AT HOSPITAL DISCHARGE AMONG AN UNINSURED POPULATION IN NYC Alice Tang; Cassia Wells; Emily Milam; Michael Janjigian. New York University, New York, NY. (Tracking ID #2199177)

BACKGROUND: It is estimated that medication nonadherence increases healthcare costs by \$170 billion annually. While there is literature illustrating causes of secondary adherence—defined as correct use of medications as prescribed—there have been limited studies on primary adherence, or the act of filling initial prescriptions. Our study attempted to identify predictors of primary nonadherence upon hospital discharge among a cohort of uninsured patients. We investigated whether patient characteristics (homelessness, psychiatric comorbidities, limited English language proficiency and age), prescription characteristics (number and whether medications were essential or new) and/or system characteristics (discharge time and whether medications were faxed prior to discharge) predicted poor rates of primary adherence at hospital discharge.

METHODS: We conducted an observational, prospective cohort study examining primary nonadherence rates among uninsured patients discharged from a large, high-volume, urban public hospital. The hospital has a pharmacy dedicated to providing free medications to the uninsured upon discharge. Our primary outcome of interest was whether the patients discharged with new prescriptions picked up their medication(s) from the discharge pharmacy within 24 h of discharge. We collected data on patients admitted to a medical service from April to June 2014 at Bellevue Hospital Center in New York City. Patients with

insurance and those transferred to another facility were excluded. Patients who had medications delivered to the bedside were also excluded. Data was obtained through pharmacy records and chart review. Chi-squared and logistic regression analysis was used to determine significant predictors of nonadherence.

RESULTS: In total, 335 patients met inclusion criteria. Of this cohort, 66.6 % were male, 24.2 % had limited English language proficiency, 12.2 % were undomiciled, and 24.2 % had a psychiatric comorbidity. The average age was 48.7 (SD 14). Only 176 patients (52.5 %) picked up their discharge prescription(s) from the hospital pharmacy within 24 h, leaving 47.5 % with primary nonadherence. Of the prescriptions that were not picked up, 123 (77.4 %) were considered essential for the patient’s post discharge care, defined as necessary for ongoing treatment of medical conditions, the absence of which could predictably lead to poor clinical outcomes. Only 9 (5.6 %) of nonadherent patients had their prescriptions faxed to the pharmacy and only 32 (9.6 %) of all prescriptions were faxed within the optimal time frame for the pharmacy (prior to the day before discharge). The greatest predictor of primary adherence was whether the prescription was faxed in advance, with 91.5 % of patients picking up faxed prescriptions, compared to 34.5 % picking up those that had not been faxed ($p<0.0001$). Other significant predictors of adherence were time of discharge (67.4 % of patients discharged in the morning, 53.7 % in the afternoon and 35 % in the evening, $p=0.004$) and age group (46.5 % of those aged <39, 51.2 % aged 40–64 and 70.5 % in those aged >65, $p=0.029$). Patient characteristics such as race, gender, English language proficiency, number of medical comorbidities, psychiatric comorbidities, homelessness, and distance from the hospital did not prove to be significant predictors of adherence. The number of prescriptions or whether the medication was essential or new also did not significantly predict adherence.

CONCLUSIONS: Primary adherence is enhanced by timely delivery of prescriptions to the pharmacy prior to discharge and a discharge time earlier in the day. Providing advanced notice to the pharmacy and discharging patients earlier in the day decreases wait times and increases likelihood of primary adherence. This illustrates the importance of early discharge planning for hospitalized patients and coordination across multiple disciplines responsible for facilitating this transition in care. Apart from increased age, patient characteristics were not predictive of primary adherence. This may be a consequence of selection bias by inpatient providers, who could opt to provide bedside delivery of medications to patients they predicted would have difficulties navigating the hospital. Additional studies evaluating outcomes, such as re-hospitalizations or mortality, amongst this cohort of nonadherent individuals are necessary to establish the clinical and financial significance of these findings.

BENEFITS AND RISKS OF WARFARIN WITH AND WITHOUT ASPIRIN FOR PREVENTION OF STROKE IN CORONARY ARTERY DISEASE OR CEREBROVASCULAR DISEASE: A META-ANALYSIS Abhishek Deshpande²; Gaurav Alreja³; Krishna Patel²; Vinay Pasupuleti¹; Michael B. Rothberg². ¹Case Western Reserve University, Cleveland, OH; ²Cleveland Clinic, Cleveland, OH; ³Baystate Medical Center, Springfield, MA. (Tracking ID #2199136)

BACKGROUND: Options for secondary prophylaxis of non-embolic stroke are limited. Randomized controlled trials (RCTs) evaluating warfarin with or without aspirin to prevent stroke have yielded mixed results. We conducted a meta-analysis of RCTs to evaluate the benefits and risks of warfarin (with and without aspirin) in patients with coronary artery disease (CAD) or cerebrovascular disease (CVD).

METHODS: We searched PubMed, Scopus, Cochrane Library, Embase and the Web of Science electronic databases for randomized trials published from January 1980 to December 2014. We did not include earlier trials, as they would not reflect the current standards of care for secondary prevention of acute coronary syndrome or cerebrovascular accident. RCTs reporting the benefits (reduced incidence of stroke) and risks (mortality, intracranial bleeds, major and minor bleeds) of warfarin (with and without aspirin) therapy were included. We excluded trials that studied the use of warfarin for atrial fibrillation, heart valves and peripheral vascular disease. Trials were stratified by the intensity of the therapeutic international normalized ratio (INR): low (INR <2), moderate (INR 2–3) and high (INR >3.0). Data were pooled across studies using the fixed and random-effects models. We expressed the associations as risk ratios (RRs) and their 95 % confidence intervals (CIs). We used the chi square test to evaluate heterogeneity among trial outcomes.

RESULTS: The initial search yielded 3572 articles of which 26 RCTs (34,983 patients) met our inclusion criteria. The duration of treatment varied from 10 weeks to 4.6 years. In 6 trials of 19,000 patients, low intensity warfarin, either alone or plus aspirin vs. aspirin alone did not reduce stroke in patients with CAD (RR 0.84, 95 % CI 0.62 to 1.13) or CVD (RR 1.21, 95 % CI 0.99 to 1.52). In 9 trials with 5869 CAD patients, moderate intensity warfarin plus aspirin vs. aspirin alone reduced stroke (RR 0.48, 95 % CI 0.29 to 0.80) but increased major bleeding (RR 2.54, 95 % CI 1.70–3.79). There were no trials of this

regimen in CVD patients. In 4 studies with 4455 patients, high intensity warfarin vs. aspirin did not decrease stroke in either patients with CAD (RR 0.41, 95 % CI 0.12 to 1.36) or CVD (RR 1.02, 95 % CI 0.49–2.13), but did increase the risk of intracranial bleeds (RR 8.68, 95 % CI 1.99–37.87).

CONCLUSIONS: The effectiveness of warfarin in secondary prevention of stroke was dependent on the target INR, as well as whether aspirin was used in conjunction with warfarin. Use of moderate intensity warfarin with aspirin reduced the risk of stroke at the price of increased bleeding. Trials of moderate intensity warfarin (or other oral anticoagulant) plus aspirin for secondary prevention of stroke should be considered.

BETA BLOCKERS AND THE RISK OF SUICIDE IN THE ELDERLY Jonathan S. Zipursky^{3,4}; Erin M. Macdonald⁵; Simon Hollands⁵; Tara Gomes^{1,5}; Muhammad Mamdani^{1,5}; Michael Paterson²; David N. Juurlink^{4,5}. ¹St. Michael's Hospital, Toronto, ON, Canada; ²Institute for Clinical Evaluative Sciences, Toronto, ON, Canada; ³University of Toronto, Toronto, ON, Canada; ⁴Sunnybrook Health Sciences Centre, Toronto, ON, Canada; ⁵Institute of Clinical Evaluative Sciences, Toronto, ON, Canada. (Tracking ID #2160069)

BACKGROUND: Beta-adrenergic antagonists (β -blockers) are commonly used among the elderly but concerns have been raised about their potential association with suicide risk. Lipophilic β -blockers enter the central nervous system readily, and may increase the risk of depression and suicidality relative to hydrophilic β -blockers. We examined the relationship between β -blocker lipophilicity and the risk of suicide in the elderly.

METHODS: We conducted a population based case-control study of multiple healthcare databases in Ontario, Canada, from January 1, 1993 to December 31, 2011. Cases were Ontarians aged 66 years or older who died of suicide within 100 days of receipt of a prescription for a β -blocker. For each case, we identified up to 4 controls who also received a β -blocker prescription in the preceding 100 days, matching on age, sex, documented hypertension and a hospitalization for coronary artery disease in the preceding year. We identified all outpatient prescriptions for oral β -blockers, categorizing each as high, intermediate or low lipophilicity based on the partition coefficient for each. We used conditional logistic regression to estimate the odds ratio for the association between suicide and type of β -blocker prescribed, with hydrophilic β -blockers as the reference group. To test the specificity of our findings, we examined the association between β -blocker lipophilicity and death from lymphoma.

RESULTS: We identified 385 individuals who died of suicide within 100 days of receiving a prescription for a β -blocker and 1540 matched controls. Use of lipophilic β -blockers (propranolol or labetalol) was associated with a more than two-fold increase in the risk of suicide (adjusted odds ratio 2.42; 95 % confidence interval 1.40 to 4.19) relative to hydrophilic β -blockers (Table 1). No increased risk was observed with β -blockers of intermediate lipophilicity. In stratified analyses, the increased risk of suicide with lipophilic β -blockers persisted in men (adjusted odds ratio 3.04; 95 % confidence interval 1.58 to 5.84) and individuals greater than the age of 76 (adjusted odds ratio 2.41; 95 % confidence interval 1.16 to 5.02). As expected, we found no association between β -blocker lipophilicity and death from lymphoma.

CONCLUSIONS: The lipophilic β -blockers propranolol and labetalol are associated with an increased risk of suicide in the elderly. Clinicians should be aware of this association, particularly in elderly individuals with other risk factors for suicide.

β -blocker lipophilicity and risk of suicide

Lipophilicity	No (%) of patients with exposure		Odds Ratio (95 % Confidence Interval)	
	Cases (n=385)	Controls (n=1540)	Unadjusted	Adjusted†
Hydrophilic*	136 (35.3)	569 (36.9)	1.0 (reference)	1.0 (reference)
Intermediate**	218 (56.6)	908 (59.0)	1.00 (0.78 to 1.28)	1.01 (0.76 to 1.33)
Lipophilic***	31 (8.1)	63 (4.1)	2.13 (1.31 to 3.44)	2.42 (1.40 to 4.19)

†Adjusted for Charlson Score, alcohol abuse in preceding year, antidepressant use in the previous year, cardiologist visits in preceding year, psychiatrist visits in preceding year, number of prescription drugs in previous year.

* atenolol, sotalol, nadolol

** metoprolol, bisoprolol, carvedilol, acebutolol, timolol, pindolol

*** propranolol, labetalol

BEYOND “GREAT JOB”: CONTENT AND QUALITY OF FEEDBACK AMONG STUDENTS ON INTERPROFESSIONAL LEARNING TEAMS Jennifer Mandal¹; Maria A. Wamsley³; Sandrijn van Schaik². ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³University of California, San Francisco, San Francisco, CA. (Tracking ID #2199391)

BACKGROUND: The ability to exchange instructive feedback with team members is considered one of the core competencies of interprofessional collaboration. Yet little is known about how and when healthcare trainees develop the skills to give substantive, useful interprofessional feedback. The objective of this study is to analyze the content and quality of peer-to-peer feedback among health professional students working in interprofessional teams.

METHODS: Students from 7 health professional schools (Dentistry, Nursing, Nutrition, Medicine, Pharmacy, Physical Therapy, and Social Work) worked in teams during a 4-h Interprofessional Standardized Patient Exercise (ISPE) to interview and develop a care plan for a complex patient. After the exercise, students were asked to provide written feedback for each of their teammates on 1) their interviewing skills and 2) their teamwork skills. We developed a scoring grid to rate the quality of the de-identified feedback comments, based on whether the comments included specific statements to continue, initiate, or discontinue certain behaviors (referred to as “keep”, “start”, or “stop” statements, respectively) as well as an anchored global usefulness score. Two independent raters scored all comments and reconciled differences in ratings. In addition, we analyzed the length of feedback comments based on word count. We calculated descriptive statistics for quality scores and comment length and compared mean scores and length between comments on interviewing skills versus those on teamwork skills with paired t-tests.

RESULTS: We analyzed 1650 feedback comments from 353 students. Of all comments, 98.1 % included a “keep statement”, 29.6 % included a “start statement” and 4.7 % contained a “stop statement”. Global usefulness scores were higher for comments on interviewing skills than on teamwork skills (3.0±0.8 vs 2.5±0.8, 4-point scale; $p<.0001$). Students wrote longer comments about interviewing skills than about teamwork skills (45±27 vs 30±19 words per comment, $P<.0001$).

CONCLUSIONS: Students participating in the ISPE were able to provide each other with reasonable quality feedback, although overall they were far more likely to provide positive, reinforcing feedback (“keep statements”) than to provide suggestions for change (“start or stop statements”). Students provided longer, higher quality feedback on their colleagues’ interviewing skills, and were more vague and brief in feedback on teamwork skills. This may reflect that students have a better understanding of, and more experience with, interviewing skills than with teamwork skills. Our results indicate a need for explicit education about interprofessional teamwork as well as training in effective feedback provision.

BRIEF MEASURES FOR EVALUATING ENGAGEMENT AND PERCEIVED USEFULNESS OF HEALTH APPS FOR PATIENTS Joseph J. Sudano^{1,3}; Adam T. Perzynski²; Misty Harris². ¹Case Western Reserve University, Cleveland, OH; ²Case Western Reserve University at MetroHealth, Cleveland, OH; ³The MetroHealth System, Cleveland, OH. (Tracking ID #2200039)

BACKGROUND: We evaluated the measurement properties of newly adapted self-report scales designed to evaluate the extent to which patients benefit from web-based, mobile and tablet health applications. While existing scales measure satisfaction with computer tools, we sought to evaluate brief measures that examine additional dimensions of user experience, notably patient engagement and patient ratings of the utility of the applications themselves.

METHODS: A sample of 105 patients, visitors and health professionals was recruited from a safety net hospital, two community organizations, and meetings of health professionals. Participants completed a health risk assessment (available at <http://healthylifeHRA.org>). Participants had the option of using a laptop or tablet for completing the HRA. Items measure Engagement (4 items; 1-not at all to 5-very), perceived usefulness (9 items; 1-disagree to 10-agree), and End User Computer Satisfaction (12 items; yes/no). A three item measure screened participants for poor/adequate numeracy.

RESULTS: Participants were 64 % female; 41 % white, 29 % black, 12 % other, 18 % did not report race; average age was 42 (range 18–86). Participants were highly satisfied with the software; 97 % responded “yes” on “easy to use,” and 100 % yes on “quick enough”, useful format and clear report. Factor analysis results supported a 3-factor model of usefulness and engagement. Cronbach’s alpha internal consistency was >0.8 for all scales. Participants rated the software as engaging them in caring for their health Mean=4.2, SD=1.0 on the 1–5 scale. The majority of patients agreed that the software is useful (Mean=7.1, SD=2.0). Numeracy screening indicated that 66 % had adequate and 34 % poor numeracy. Participants with poor numeracy rated the software as *more useful* (8.1 vs 6.7,

$p=.007$) than participants with adequate numeracy. Usefulness and Engagement had moderate associations with an existing measure of computer satisfaction.

CONCLUSIONS: Brief, easy to administer self-report questions can be used to evaluate the extent to which health applications are found to be useful and engaging by patients and

other users. Variability on these adapted measures is sufficient to capture differences according to key variables (such as numeracy for understanding the potential unintended consequence for apps to increase inequality via the “digital divide”). Future work is necessary to examine these measures in larger samples and with other health apps.

Correlations

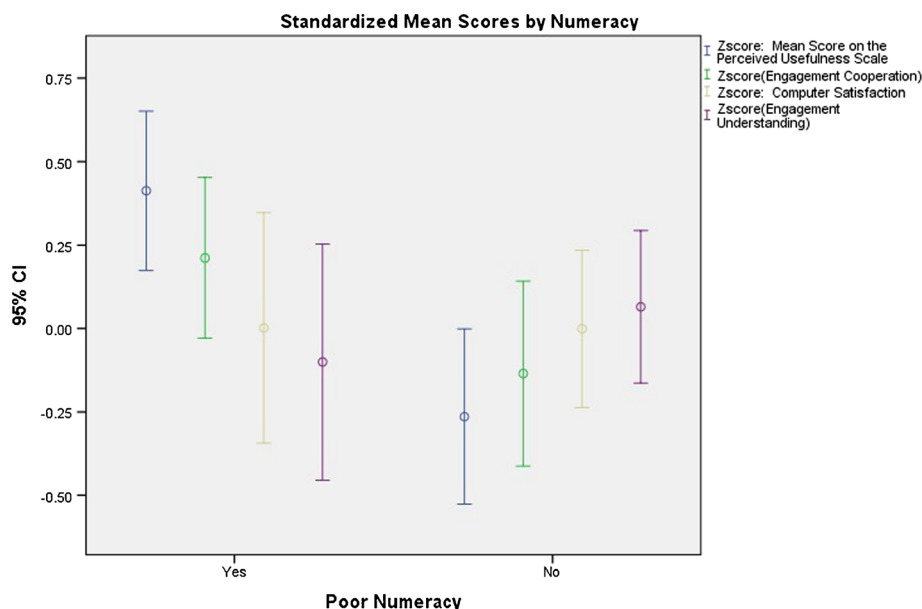
Imputation Number: Pooled

Pearson Correlation

	Computer Satisfaction	Mean Score on the Perceived Usefulness Scale	Engagement Understanding	Engagement in Cooperation
Computer Satisfaction	1	.462**	.304**	.446**
Mean Score on the Perceived Usefulness Scale	.462**	1	.211*	.573**
EngagementU	.304**	.211*	1	.383**
EngagementC	.446**	.573**	.383**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).



BRING IT TO THE BEDSIDE: TABLET COMPUTERS INCREASE TEAM-PATIENT INTERACTIONS Blake R. Barker; Brett Moran; James M. Wagner. UT Southwestern Medical Center at Dallas, Dallas, TX. (Tracking ID #2194116)

BACKGROUND: Once the primary form of care delivery and medical education in academic medical centers, rounding at the patient's bedside has become an increasingly infrequent rounding style. Prior investigators have observed that bedside rounding occurred less than 25 % of the time. Concerned medical educators have advocated for curricula that increase the frequency of bedside rounding. The impact of technology, including electronic medical records (EHR), on rounding styles is unknown. However, medical educators have expressed concern that it may detract from patient interactions. In a prior observational study at our institution, two distinct rounding patterns of general internal medicine inpatient teaching teams were identified: “Room rounders”, which represented 27 % of the team rounding styles observed, stayed in a conference room for the majority of the patient presentations. This pattern was found to be associated with significantly greater use of the EHR and fewer distractions. Contrasting this were the “ward rounders” who primarily presented patients in the hallway or in the patient room. “Ward rounders” were found to access the EHR and use electronic technology much less but had significantly more patient interaction, including discussion the plan of care with the patient and attending examination of the patient in the presence of the team. The

hypothesis that the provision of tablet computers and encouraging ward rounding would provide equivalent EHR access with an increase in team-patient bedside interactions was explored.

METHODS: Over two consecutive months in 2013, an intervention study was conducted on ten general medicine teaching teams at Parkland Memorial Hospital, a large county hospital and primary teaching site of UT Southwestern. Five of the ten teams were randomly selected to receive four tablet computers each. These teams were provided a brief introduction on tablet functionality and were asked to conduct rounds outside of the conference room. Behaviors of intervention and control teams were recorded by observers utilizing a standardized checklist codifying team rounding patterns, including patient interaction, EHR use, teaching time and team distractions. Data were analyzed using chi-square and Fisher's Exact Tests with p -value<0.05 as an indicator for statistical significance.

RESULTS: Intervention teams were observed using tablet computers and rounding outside of the conference room more frequently than control teams (50 % vs 18 %, $p<0.0001$; 71 % vs. 34 %, $p<0.0001$, respectively). Observed EHR access during patient encounters was similar between intervention and control groups (50 % for both groups). Intervention teams visited the bedside of a similar number of patients (75 % vs. 71 %, $p=0.33$) and spent a similar amount of time with patients (222 s vs. 197 s, $p=0.64$). Attendings of intervention teams were observed examining patients more often than control teams, but this did not

reach statistical significance (57 % vs. 48 %, $p=0.05$). Intervention teams were observed exchanging information with patients and discussing the plan of care with patients significantly more often than control teams (75 % vs 65 %, $p=0.03$; 71 % vs 61 %, $p=0.03$, respectively). Intervention teams spent a similar amount of time teaching but also encountered more distractions per patient encounter (2.6 vs 1.8, $p=0.005$).

CONCLUSIONS: By simply providing handheld technology in the form of tablet computers and a recommendation to round outside of the conference room, internal medicine teaching teams at a large academic hospital were observed exchanging more information with and more often discussing plans of care with patients. There was also a trend towards increased examination of the patient by the attending during rounds. Access of EHR, visits to the bedside during rounds, time spent with patients and teaching time were all similar. We feel this study suggests that tablet computers can add value to patient care teams and particularly medical education through increased team-patient bedside interactions and role modeling while providing similar degree of EHR access. This may come at the cost of increased team distractions.

Comparison of Control and Intervention Groups Rounding Behaviors

Variable	Control	Intervention	P value
Tablet used during rounds (y/n)	18.13 %	50.31 %	< 0.0001
Rounds occurred outside conference room	34.38 %	71.17 %	< 0.0001
Total time spent rounding (min)	742	637	0.0118
Percent of patients visited during rounds	70.63 %	75.46 %	0.3274
Time spent with each visited patient	197 s	222 s	0.6358
Examination of patient by the attending during rounds	47.94 %	56.98 %	0.0532
Exchange of information with the patient during rounds	65.40 %	74.86 %	0.0291
Discussion of plan with patients during rounds	60.95 %	70.95	0.0255
Access of EHR during rounds	49.54 %	50.46 %	0.2379
Patient-related teaching time (sec)	141	100	0.12
Non-patient related teaching time (sec)	260	408	0.9415
Distractions per patient encounter	1.84	2.60	0.0045

BUILDING INFRASTRUCTURE: LESSONS LEARNED FROM A PARTNERED COMMUNITY-ACADEMIC GRANT WRITING SERIES Keyonna M. King¹; Yvette-Janine Pardo²; Keith Norris¹; D'Ann Morris³; Arleen F. Brown¹. ¹UCLA, Los Angeles, CA; ²Assist Management Consulting, LLC, Pasadena, CA; ³Los Angeles Urban League, Los Angeles, CA. (Tracking ID #2196498)

BACKGROUND: Many new funding opportunities to improve community/population health require substantial community and academic partnership. To strengthen community and academic infrastructure for sustainable partnered research, the UCLA CTSI Community Engagement and Research Program (CERP) developed a Partnered Community-Academic Grant Writing Series.

METHODS: We implemented a novel, no-cost, 13-week grant writing workshop focused on paired community-academic partners. The workshop was conducted between April and June 2013 and had three goals: 1) to identify teams of community stakeholders and academic investigators who were ready to write a partnered proposal, 2) to introduce these partnered grant writing teams to diverse sources of funding and standard grant writing language, and 3) to assist the teams in writing proposals that effectively demonstrate evidence of partnership. The series curriculum was modified from traditional grant writing workshops originally designed as separate courses for community organizations or for academic investigators. A half-day introduction session (Are you grant ready?) was held to promote the intensive grant writing workshop and introduce partnered grant writing to community and academic organizations interested in learning how to partner to write proposals. The modules of the intensive grant writing workshop were: 1) Community-based participatory research (CBPR) and collaborative community-academic grant writing; 2) writing corporate, community, and private foundation grant writing; and 3) NIH unsolicited grant writing. Eligible teams for the intensive grant writing sessions were required to have at least 2 representatives from the partnering community organization (to enhance capacity building) and an academic investigator. Teams were selected by the CERP leadership and staff. Teams were tracked to determine outcomes. At six- and 12-months teams were asked to complete an online post-workshop evaluation asking questions about partnered proposal submissions.

RESULTS: Of the 16 teams that submitted LOIs, 10 with varying levels of grant writing experience were invited to participate. Weekly feedback helped CERP staff iteratively

review goals/needs and modify the program. On average, 22 people attended each week, and all teams were represented each week. At the end of the 13-week intensive grant writing series, the majority of attendees (93.3 %) indicated they understood the benefits of partnering, could identify appropriate grant funding opportunities (86.6 %), and understood foundation and NIH grant writing language (84.2 and 68.8 %, respectively). At 12 month follow up, 2 teams submitted one proposal, 1 team had submitted two proposals, and 1 team had submitted 3 proposals. Three of the teams were awarded funds totaling \$1.87 million. One team is revising their proposal for a different funding agency.

CONCLUSIONS: We developed a novel and innovative approach to community-academic partnered grant writing with early evidence that participating in the workshop enhanced capacity for partnered research, building both team self-efficacy and success in applying for available research funding. We will continue to track the features of the partnerships and their products and will modify the series based on these early experiences and the recommendations of the participants.

BUILDING SUSTAINABLE SCREENING, BRIEF INTERVENTION, AND REFERRAL TO TREATMENT (SBIRT) WITHIN PRIMARY CARE IN AN INTEGRATED HOSPITAL SYSTEM IN NEW YORK, NYSBIRT-II: AN IMPLEMENTATION MODEL Jeanne Morley⁵; Sandeep Kapoor^{5,1}; Megan O'Grady²; Nancy Kwon³; Mark Auerbach⁴; Jon Morgenstern³; Charles Neighbors²; Joseph Conigliaro⁵. ¹The Feinstein Institute for Medical Research, Manhasset, NY; ²The National Center on Addiction and Substance Abuse at Columbia University (CASAColumbia), New York, NY; ³North Shore Long Island Jewish Health System, New Hyde Park, NY; ⁴North Shore Long Island Jewish Health System, Bay Shore, NY; ⁵North Shore Long Island Jewish Health System, Manhasset, NY. (Tracking ID #2196410)

BACKGROUND: Screening, Brief Intervention, and Referral to Treatment (SBIRT) for substance misuse has received a great deal of empirical support. Despite the strong evidence for effectiveness and a compelling rationale for its integration, the circumstances under which it is likely to be implemented and sustained remains elusive. In 2013, the North Shore LIJ Health System, the National Center on Addiction and Substance Abuse at Columbia University (CASAColumbia), and the Office of Alcoholism and Substance Abuse Services (OASAS) established a partnership funded by Substance Abuse and Mental Health Services Administration (SAMSHA), to build a sustainable SBIRT program within an integrated Hospital System in Hurricane Sandy affected areas of the New York metropolitan area, NYSBIRT-II. By the end of the 5-year funding, the model developed for Emergency Department and Primary Care sites will serve as the basis for subsequent dissemination of SBIRT services throughout New York State. Our objective is to describe the implementation process in NYSBIRT-II Primary Care sites during year one and to report our cumulative results.

METHODS: The SBIRT model was implemented as follows: 1) At every patient visit, Medical Office Assistants (MOA) administered a 5-question SBIRT Pre-Screen for alcohol, drug, and tobacco use while measuring vital signs prior to a Physician (MD) visit 2) Completed screens were then reviewed in real time by the SBIRT Health Coach (HC); 3) Patients with positive pre-screens were approached by the HC either during or at the end of the MD portion of the visit to complete a full screen (AUDIT and/or DAST-10); 4) Brief interventions and referrals to treatment were performed by the HC as indicated based on the full screen score.

RESULTS: Implementation has occurred in three Primary Care Sites including one designated Level III Patient Centered Medical Home (PCMH), with the initial site providing SBIRT services since December 2013. Initial implementation was evaluated using Government Performance and Results Act (GPRA) data. In the first year, 24,068 patients were PreScreened with an 11.8 % positive rate. The patients were diverse, with more women than men prescreened (63 % female) Age: 18–24 (3.7 %), 25–34 (10.2 %), 35–49 (24.8 %), 50–59 (24.9 %), ≥60 (36.3 %) Ethnicity: Latino (24.7 %) Race: Caucasian (38.2 %), African American (18.5 %), Asian (7.4 %), Other (35.9 %). Nearly 1875 full screens were conducted with a 33 % positive rate, resulting in 537 brief interventions and 114 referrals to brief or formal addiction treatment. Abuse of multiple substances was an issue for many patients, with 14.7 % of patients positive on both the AUDIT and the DAST10, with marijuana, cocaine and hallucinogens as the most commonly used drugs.

CONCLUSIONS: SBIRT services in a large, integrated health system are needed, and can be successfully implemented. SBIRT allows the clinical team to efficiently identify and address substance misuse at the point of service. Further research will focus on how to make SBIRT universally sustainable in the Primary Care setting and play a role in the continued integration of Behavioral Health in Primary Care.

Building Sustainable Screening, Brief Intervention, and Referral to Treatment (SBIRT) within Primary Care in an Integrated Hospital System in New York, NYSBIRTII: An Implementation Model

Consented for Government Performance and Results Act (GPRA)						
	Total PreScreened	Screen Negative (Pre/Full) *	Full Screen Positive **	Brief Intervention	Brief Treatment	Referral to Treatment
	n=24,068	n=23,531 (97.7%)	n=537 (2.3%)	n=423 (1.8%)	n=70 (0.3%)	n=44 (0.2%)
Age						
18-24	879 (3.7%)	799 (3.4%)	80 (14.9%)	63 (14.9%)	13 (18.6%)	4 (9.1%)
25-34	2,453 (10.2%)	2,343 (10.0%)	110 (20.5%)	79 (18.7%)	19 (27.1%)	12 (27.3%)
35-49	5,969 (24.8%)	5,829 (24.8%)	140 (26.1%)	113 (26.7%)	20 (28.6%)	7 (15.9%)
50-59	5,992 (24.9%)	5,867 (24.9%)	125 (23.3%)	99 (23.4%)	13 (18.6%)	13 (29.5%)
60-64	2,985 (12.4%)	2,940 (12.5%)	45 (8.4%)	41 (9.7%)	1 (1.4%)	3 (6.8%)
65-79	4,621 (19.2%)	4,585 (19.5%)	36 (6.7%)	27 (6.4%)	4 (5.7%)	5 (11.4%)
80+	1,125 (4.7%)	1,124 (4.8%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)
Gender						
Male	8,900 (37.0%)	8,514 (36.2%)	386 (71.9%)	301 (71.2%)	59 (84.3%)	26 (59.1%)
Female	15,168 (63.0%)	15,017 (63.8%)	151 (28.1%)	122 (28.8%)	11 (15.7%)	18 (40.9%)
Ethnicity						
Hispanic/Latino	5,952 (24.7%)	5,786 (24.6%)	166 (30.9%)	133 (31.4%)	20 (28.6%)	13 (29.5%)
Non-Hispanic/Latino	16,041 (66.6%)	15,670 (66.6%)	371 (69.1%)	290 (68.6%)	50 (71.4%)	31 (70.5%)
Other	2,075 (8.6%)	2,075 (8.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

* This includes patients who were PreScreen NEGATIVE and PreScreen Positive-Full Screen NEGATIVE.

** This includes patients who were Full Screen POSITIVE and CONSENTED to GPRA. Non-consents not included.

Building Sustainable Screening, Brief Intervention, and Referral to Treatment (SBIRT) within Primary Care in an Integrated Hospital System in New York, NYSBIRTII: An Implementation Model

Consented for Government Performance and Results Act (GPRA)

	Full Screen Positive *
	n=537 (2.2%)
Substances	
Alcohol Only	199 (37.1%)
Drugs Only	259 (48.2%)
Alcohol and Drugs	79 (14.7%)
Drug Use n=338 (62.9%)	
Marijuana	192 (56.8%)
Cocaine	18 (5.4%)
Hallucinogens	5 (1.5%)
Percocet	5 (1.5%)
Benzodiazepines	4 (1.2%)
Codeine	4 (1.2%)
Tylenol 2,3,4	3 (0.9%)
Heroin	2 (0.6%)
Other Illegal Drugs	2 (0.6%)
Non-prescribed Methadone	2 (0.6%)
Methamphetamine	2 (0.6%)
Morphine	2 (0.6%)

* This includes patients who were Full Screen POSITIVE and CONSENTED to GPRA. Non-consents not included.

BUPRENORPHINE INITIATION AND LINKAGE TO OUTPATIENT BUPRENORPHINE TREATMENT DOES NOT REDUCE FREQUENCY OF INJECTION DRUG USE FOR INPATIENT OPIOID-DEPENDENT INJECTION DRUG USERS: RESULTS OF A RANDOMIZED CLINICAL TRIAL Phoebe A. Cushman¹; Bradley J. Anderson^{2, 3}; Meredith Moreau⁴; Michael D. Stein^{2, 3}; Jane M. Liebschutz¹; ¹Boston University, Boston, MA; ²Butler Hospital, Providence, RI; ³The Warren Alpert Medical School of Brown University, Providence, RI; ⁴The Fenway Institute, Boston, MA. (Tracking ID #2190822)

BACKGROUND: Buprenorphine opioid agonist treatment has established effectiveness for patients with opioid substance use disorders who seek treatment in the outpatient setting. Our STOP (Suboxone Transition to Opiate Program) study showed that initiation of buprenorphine for hospitalized patients with opioid substance use disorders (both injection drug users and non-injection drug users) resulted in 72 % entry into outpatient treatment and decreased odds (0.6 aOR) of illicit opioid use over 6 months. The objective of this planned subgroup analysis of the injection drug users was to determine if buprenorphine initiation during hospitalization and linkage to outpatient-based buprenorphine treatment after discharge reduces injection drug users' number of injection drug days compared to an in-hospital buprenorphine detoxification.

METHODS: From August 1, 2009, through October 31, 2012, opioid-dependent inpatients at an urban safety-net hospital were enrolled in a randomized clinical trial (RCT) and randomized to either detoxification (5-day buprenorphine taper) or linkage (buprenorphine induction, bridge prescription, and facilitated referral to outpatient treatment within 1 week of discharge) conditions. The main outcome for this subgroup analysis of

injection drug users was prior 30-day injection of opioids (self-report) at 1, 3, and 6 months, measured using a standard 30-day timeline follow-back (TLFB) method. Intervention effects were estimated using a fixed-effects panel regression model; this method compares within-subject change over time and controls for all time-invariant between-subject differences. The intervention effect was estimated as the treatment-by-time interaction. We also measured the effectiveness of the linkage in terms of the percent of patients in each group who presented to an initial visit at an outpatient buprenorphine program after hospital discharge. Finally, we conducted a person-day analysis by using a generalized estimating equation (GEE) to evaluate the association between prescription buprenorphine use and injection drug use during follow-up.

RESULTS: A total of 139 eligible patients were randomized; we limited our analysis to those participants in the detoxification ($n=62$) and linkage groups ($n=51$) who reported baseline injection drug use. There were no significant differences with respect to age (mean 39.5 years; $t=-0.78$, $p=.440$), gender (69.0 % male; $X^2=0.81$, $p=.368$), ethnicity (48.7 % non-Latino Caucasian; 23.0 % African-American, 20.4 % Latino, 8.0 % other, $X^2=3.66$, $p=.301$), or baseline frequency of injection drug use (mean 67.8 % of TLFB days; $t=0.10$, $p=.923$) between the two groups. At follow-up, patients in the linkage group (70.6 %) were significantly ($X^2=44.46$, $p<.001$) more likely to present to an initial visit at a buprenorphine program than those in detoxification group (9.7 %). However, there was no statistically significant difference in the proportion of days of injection drug use between the linkage and detoxification groups at follow-up. The treatment-by-time interaction was not statistically significant ($LR^2=2.85$, $df=3$, $p=.415$). Individual coefficients for treatment effects at 1- ($b=0.03$, $t=0.48$, $p=.634$), 3- ($b=0.09$, $t=1.06$, $p=.288$), and 6-months ($b=-0.02$, $t=-0.27$, $p=.787$) were not statistically significant. Using a person-day analysis, participants self-reported injection drug use on 5.8 % of follow-up days in which they also reported prescription buprenorphine use and 37.5 % of days in which they did not report prescription buprenorphine use. Using GEE, the odds of injection drug use was estimated to be 4.57 ($z=-12.81$, $p<.001$) times higher on days when prescription buprenorphine was not used.

CONCLUSIONS: Despite the robust effectiveness of the linkage protocol in facilitating entry of hospitalized, opioid-dependent injection drug users into initial outpatient buprenorphine treatment, the intervention did not decrease their frequency of injection drug use. Injection drug users may require a more intensive buprenorphine treatment protocol than do non-injection misusers of opioids. In particular, many hospitalized injection drug users are not actively seeking treatment for substance misuse and are likely to have especially complex medical and social needs. Further research is needed to determine how to engage these highly vulnerable patients in sustained addiction treatment beyond the initial linkage.

BURDEN OF BENZODIAZEPINE AND OPIOID OVERDOSE ON HOSPITALS IN USA: ANALYSIS OF NATIONWIDE EMERGENCY DEPARTMENT SAMPLE DATA Sourabh Aggarwal²; Devin B. Malik²; Akshay Amaraneni²; Andrew Whipple¹; Christopher M. Begley¹. ¹Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI; ²Western Michigan University School of Medicine, Kalamazoo, MI. (Tracking ID #2197613)

BACKGROUND: Opioid and Benzodiazepine drug abuse has been an emerging health care problem. It has significant implications on healthcare with associated morbidity and mortality. The trend and impact of the opioid and BZD overdose on USA hospitals has never been studied.

METHODS: We queried Nationwide Emergency Department (ED) Sample data for all the patient visits with first listed diagnosis of BZD overdose and opioid overdose using International Classification Code 9 codes of 969.4 and 965.09 respectively. Data was extracted for the years 2006 to 2011. Admission rate to

hospitals during ED visits and in-hospital mortality for admitted patients was calculated.

RESULTS: We identified a total of 510,725 ED visits with first listed diagnosis of BZD overdose during 2006–2011 with rate of visits increasing from 25.7 per 100,000 total visits in 2006 to 28.7 per 100,000 total visits in 2011 with average admission rate of 46.94 % and in-hospital mortality rate of 0.78 %. We identified a total of 222,856 ED visits with first listed diagnosis of Opioid overdose during years 2006–2011 with rate of visits increasing from 9.9 per 100,000 total visits in 2006 to 13.8 per 100,000 total visits in 2011 with average admission rate of 48.54 % and in-hospital mortality of 1.77 %.

CONCLUSIONS: Our study reveals a significant burden of BZD and opioid overdose on hospitals in USA with increasing rate of hospitalizations. It indicates there is a large unmet need for interventions to regulate the use and prescription of controlled drugs.

BUT DOCTOR, I JUST ATE...THE RELATIONSHIP BETWEEN POST-PRANDIAL TIME AND RANDOM GLUCOSE VALUES Michael E. Bowen¹; Lei Xuan²; Ildiko Lingvay¹; Ethan Halm¹. ¹UT Southwestern Medical Center, Dallas, TX; ²University of Texas Southwestern Medical Center at Dallas, Dallas, TX. (Tracking ID #2199277)

BACKGROUND: Non-fasting, random blood glucose (RBG) values are common and can identify patients at risk for dysglycemia (diabetes-prediabetes) in clinical practice. However, evidence guiding the interpretation of RBG values is limited. We sought to characterize the relationship between RBG values and prandial time and determine the postprandial time at which RBG values can best differentiate individuals with dysglycemia.

METHODS: We conducted a cross-sectional analysis of merged data from the 2007–20012 National Health and Nutrition Examination Survey (NHANES). The study sample included non-pregnant, non-fasting adults age ≥ 18 without diagnosed diabetes who had both a RBG and hemoglobin A1C (A1C) available. Participants consuming anything other than water in the 9 h before lab testing were considered non-fasting. Glycemic status was characterized using A1C as normal < 5.7 % or undiagnosed dysglycemia ≥ 5.7 %. Prandial time was modeled as a predictor of RBG using linear regression. We utilized unadjusted models to demonstrate the usefulness of this approach to identify undiagnosed dysglycemia in a real-world ambulatory clinic setting. We present the estimated prediction of RBG values at different prandial times using predictive margins. RBG values ≥ 100 mg/dL were considered clinically relevant glucose elevations.

RESULTS: A total of 7483 participants met inclusion criteria. Those with dysglycemia ($n=2406$) were older (55.2 vs. 41.5; $p<0.001$), had higher BMIs (30.3 vs. 27.3; $p<0.001$), higher RBG values (103.6 vs. 89.2; $p<0.001$), and were more likely to be non-white (35.9 % vs. 28.1 %; $p<0.001$). Sex did not differ between groups. A statistically, but not clinically meaningful difference in prandial time of 12 min was observed between groups (2.9 vs. 2.7 h; $p<0.001$). The predicted marginal RBG values ranged from 7.6 to 18.3 mg/dL higher in the dysglycemia group and were significantly higher in the dysglycemia group at all time points ($p<0.001$; Figure). Predicted marginal RBG values in participants with normal glycemic status were always below 100 mg/dL in the first 9 h after intake. In the dysglycemia group, RBG values between 0 and 3 h after a meal were always significantly ≥ 100 mg/dL (Figure). If all individuals with a RBG ≥ 100 mg/dL between 0 and 5 h after a meal were screened with an A1C, 96.4 % of dysglycemia cases could be identified. Among those with dysglycemia, predicted RBG values at postprandial time ≥ 6 h were ≤ 100 mg/dL, which is below the fasting glucose cutpoint to diagnose dysglycemia.

CONCLUSIONS: RBG values ≥ 100 during 0–5 h after a meal are associated with dysglycemia and should prompt definitive diabetes testing. In routine clinical practice, RBG values could identify the majority of patients with dysglycemia, and fasting more than 6 h in clinical practice may not improve the detection of dysglycemia.

The Relationship Between RBG Values and Postprandial Time Stratified by Glycemic Status

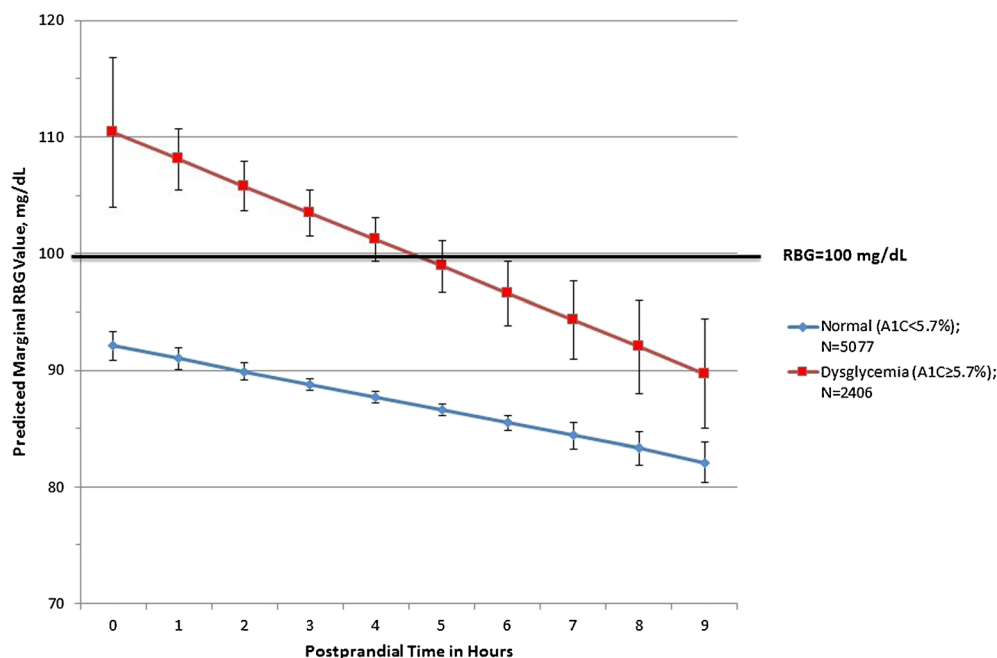


Figure 1. The Relationship Between Random Glucose Values and Postprandial Time Stratified by Glycemic Status

CALLING IT LIKE YOU SEE IT: THREE-HOUR WORKSHOP IMPROVES

HOSPITALISTS OBSERVATION AND FEEDBACK SKILLS Margaret Horlick², Louis H. Miller³, Patrick M. Cocks⁴, Lynn Bui⁵, Mark D. Schwartz², Anne Dembitzer¹. ¹NY Harbor VA, New York, NY; ²NY Harbor VA Healthcare Center, Brooklyn, NY; ³NYU School of Medicine, New York, NY; ⁴NYU School of medicine, New York, NY; ⁵New York University, New York, NY. (Tracking ID #2197982)

BACKGROUND: The implementation of the New Accreditation System (NAS) by the ACGME requires that residency programs focus their assessment of trainees on developmental milestones in part via direct observation as they care for patients. Clinician Educators (CE) are the primary evaluators of graduate trainees and yet they have had little to no education in this area. The ABIM advocates a model that uses performance dimension training and the development of shared mental models. Participation in a daylong ABIM workshop was associated with improved confidence and performance of direct observations and assessments. We sought to create a workshop that could be easily integrated into the professional lives of CEs and evaluate the impact on faculty's confidence and skill in providing observation and feedback, and change in self-reported teaching behaviors.

METHODS: We recruited hospitalist physicians from three institutions to participate in a 3-h workshop. Participants were divided into small groups of 3–4 faculty. The workshop focused on interactive skill building using performance dimension training, shared mental models and role-plays. We evaluated the impact of this training on teaching confidence using pre and post surveys that asked faculty to rate their confidence on a 1–4 scale from “not confident” to “very confident.” Teaching performance was assessed using pre and post OSTE. Standardized learners rated teaching performance using a checklist that that included 10 items specifically to assess observation and feedback; items were rated as “not done,” “partly done,” or “well done”. Teaching behavior change was assessed by 4 month follow-up on faculty's commitment to change statements that were completed at the conclusion of the workshop.

RESULTS: Eighteen hospitalists completed the workshops and all assessments. Sixty-five percent were male with an average of 4 years in practice (range 1 to 8 years). Teaching confidence improved after participation in the workshop as the percentage of participants who reported themselves to be very confident in feedback and evaluation rose from 32 to 52 % ($p=0.006$). Teaching performance also improved—the percentage of participants that received a score of “well done” for observation and feedback in the OSTE improved from 42 to

85 % ($p=0.00003$). Participants improved their use of a shared mental model as the proportion of faculty rated “well done” on, “outlined to learner what you would be looking for during his/her exam” improved from 7 to 85 % ($p=0.00004$). Participants also improved in providing behaviorally specific positive feedback from 50 to 92 % well done ($p=0.008$). In addition, at four-month follow up, 81 % of participants reported they had partially or fully implemented the changes they had committed to in their teaching practice.

CONCLUSIONS: Focused, interactive faculty development can both improve faculty's observation and feedback skills and impact their teaching practice. Pragmatic NAS aligned medical center wide faculty workshops have the potential to change the culture of assessment in a residency program.

CAN PATIENT-CENTERED CARE INNOVATION AFFECT PATIENTS' EXPERIENCES OF CARE? Mark Meterko^{2,3}, Errol Baker², Corey Pilver², Anna M. Barker¹, A. Rani Elwy^{1,3}, Joel Reisman¹, Kelly Dvorin¹, Barbara G. Bokhour¹. ¹ENRM Veterans Affairs Medical Center, Bedford, MA; ²VA Boston Healthcare System, Boston, MA; ³Boston University School of Public Health, Boston, MA. (Tracking ID #2198142)

BACKGROUND: Providing patient-centered care (PCC) in an outpatient setting has become a priority for many medical centers, including the US Department of Veterans Affairs. A myriad of changes may lead to PCC, yet it is unclear as to the effectiveness of efforts to transform the culture of care. The VA Office of Patient-Centered Care and Cultural Transformation has designated certain medical centers as PCC Centers of Innovation (COI), noting them to be leaders in PCC transformation. Innovations have included changes in the physical environment, inclusion of complementary integrative medicine, education of staff to improve patient-centered communication, incorporation of health coaching, and a focus of care on patients' whole health and well-being. We sought to evaluate the impact of ongoing programmatic changes at one outpatient clinic at a VA Center of Innovation for PCC.

METHODS: We conducted a cross-sectional survey of patient-centered care attitudes at two sites, one of which was the PCC Center of Innovation and the other was a matched comparison site. To assess the impact of the natural experiment in PCC innovation at the PCC innovation site, we purposively selected a comparison site that had not been engaged in PCC transformation and was similar to the innovation site with regard to overall complexity, urban location and geographic region. Samples of 300 recent ambulatory care patients were randomly selected at each site to receive a mail survey. Adjusting for potential respondents who could not be contacted, response rates of 44.4 % ($n=118$) and 36.8 % ($n=106$) were obtained at the innovation and comparison sites, respectively. The survey consisted of several standardized measures of the extent to which interactions with the primary care team were experienced as patient-centered including 1) shared decision

making (CollaboRATE) and 2) patient-centered communication (Communication Assessment Tool). Additional standardized measures assessed perception of the physical environment (Perceived Environmental Quality Index - PEQI) and overall visit satisfaction. We measured more distal outcomes including 1) health and functional status (Patient Reported Outcomes Information System - 29); 2) self-care confidence (Self-Efficacy for Managing Chronic Disease); and 3) mindfulness (Mindful Attention Awareness Scale). Sites were compared using both simple bivariate analyses and multivariable models adjusted for observed site differences in patient health status, tenure with primary care provider, and ethnicity.

RESULTS: Scores for the innovation site were significantly more favorable than the comparison site on all measures of the perceived patient-centeredness of visit care processes. Scores on shared decision making (CollaboRATE) on a scale from 0 (no effort) to 10 (every effort), adjusted for demographic differences between the sites, were significantly higher among innovation site outpatients (9.2) compared to those at the comparison site (8.3; $p < .03$). Patients at the innovation site also significantly more frequently endorsed "Excellent" on CAT, relative to comparison site patients (59.3 % vs. 39.5 %, $p < .001$). Regarding overall visit satisfaction, when asked to think back on their most recent visit and rate it overall on a scale from 0 (worst possible) to 10 (best possible), about 73 % of innovation site outpatients rated their visit as a 9 or 10 compared to about 54 % of comparison site outpatients ($p < .01$). Adjustment for site differences in patient demographics and background using logistic regression confirmed these initial bivariate findings, indicating that intervention site outpatients were almost 2.5 times more likely than comparison site outpatients to rate their office visit as the best or almost best possible (odds ratio=2.43, $p < .01$). Scores on the perception of the environment (PEQI) on a 7-point scale (1–7, from negative to positive), adjusted for demographic differences between sites, were significantly higher among PCC innovation site outpatients (6.4) relative to the comparison site (5.7; $p < .01$). No significant differences were found for the distal outcome measures.

CONCLUSIONS: Results suggest that innovations at the VA Center of Innovation have had a positive impact on the extent to which Veterans experience the communication processes and the physical environment as patient-centered and on overall visit satisfaction, an immediate outcome of the outpatient care process and environment. We did not see evidence yet of an impact on longer-term outcomes measured for this evaluation, including self-reported health, functional status, or health-related attitudes. These findings indicate that efforts to transform care to being more patient-centered can positively impact patients' experience of the care they receive.

CAN WE IDENTIFY MINORITY PATIENTS AT RISK OF NON-ADHERENCE TO ANTIPLATELET MEDICATIONS AFTER CORONARY STENT PLACEMENT Leonardo Tamariz; Ana M. Palacio; Olveen Carrasquillo. University of Miami, Miami, FL. (Tracking ID #2199185)

BACKGROUND: Lack of medication adherence is associated with significant morbidity and mortality particularly among minority groups. Interventions shown to improve adherence are complex and difficult to sustain in real world settings. Learning how to identify and target subjects at risk of non-adherence is key to disseminate successful strategies. The purpose of this study was to identify predictors of non-adherence to antiplatelet medications post coronary stent placement among Black and Hispanics enrolled into a randomized clinical trial that compared two interventions to improve adherence.

METHODS: We used data collected for a randomized clinical trial that recruited 452 Black and Hispanic subjects with a coronary stent to compare a phone-based Motivational interviewing intervention to a mailed educational video. The primary outcome was 12-month adherence to antiplatelet medications measured by the claims based Medication Possession Ratio (MPR) and by the Medication Adherence Morisky Scale (MMAS-4). Adequate adherence was defined as $MPR \geq .80$ and a Morisky score of 4. At enrollment which occurred within 90 days of stent placement, we collected demographic information including race, income, marital status, education as well as health literacy, the PHQ-9 to screen for depression, the MMAS-4, Charlson comorbidity score, acculturation and pill burden. We used univariate and multivariate logistic regression to identify predictors of non-adherence. We also calculated the area under the curve of multiple combinations of baseline variables.

RESULTS: We recruited 452 subjects with an average age of 69.52 ± 8.8 . Of those 57 % were male and 57 % were Hispanic. Seventy eight percent had a median income below or equal to \$30,000 and 22 % completed high school or higher. Univariate analyses revealed that the MMAS-4 ($p = 0.01$), difficulty remembering to take medications ($p = 0.03$), not having a household partner ($p < 0.01$), PHQ2 ($p = 0.01$), PHQ9 ($p < 0.01$) were significantly associated with inadequate adherence. Low health literacy and speaking more Spanish than English had marginal significance ($p = 0.06$). The table reports the multivariate analyses. The combination of the Morisky Score score and the PHQ2 had the highest area under the curve $0.57(95\% \text{ CI } 0.51-0.61)$ however it was not significantly better ($p =$

0.07) than only the Morisky score $0.56(95\% \text{ CI } 0.48-0.57)$. Sixty three percent of those who had adequate adherence according to the baseline MMAS-4 and who screened negative for depression with the PHQ2 (less than 3 points) had adequate 12 month adherence compared to 48 % of those who had a MMAS-4 less than 4 and a PHQ2 of 3 points or more ($p < 0.01$)

CONCLUSIONS: Subjects with multiple comorbidities, particularly depression with suboptimal MMAS-4 at baseline are at higher risk of poor 12 month adherence after stent placement. The evaluation of the positive and negative predictive values of these variables in a non-intervened population could help in the development of a screening tool.

Multivariate evaluation of predictors

Variable	Odds ratio (95 % CI)	p-value
MMAS-4	1.7(1.0-2.6)	0.01
Difficulty remembering	0.2(0.1-0.4)	<0.01
Health literacy	1.7(0.9-3.1)	0.08
PHQ-9	0.9(0.8-1.0)	0.09
Motivational interviewing	3.5(1.9-6.7)	<0.01
Charlson score	0.8(0.8-0.9)	0.02

CAREGIVER BURDEN AND FAITH: SOCIO-DEMOGRAPHIC PREDICTORS OF STRAIN DURING END-OF-LIFE CARE. Jorge A. Dorantes²; Michael Green³; Benjamin Levi³; Jane Schubart³; Renee R. Stewart³; Alyssa Harlow¹; Lisa S. Lehmann². ¹Brigham and Women's Hospital, Cambridge, MA; ²Brigham and Women's Hospital, Boston, MA; ³Penn State College of Medicine, Hershey, PA. (Tracking ID #2200240)

BACKGROUND: Family caregiving for patients with end-stage medical conditions is a potentially transformative experience that can be both intensely burdensome and profoundly meaningful. The burden of caregiving may be related not only to the challenge of meeting medical demands, but also caregiver marital status, relationship with patient, and employment status. Despite an increasing awareness of the benefits in acknowledging a patient's personal values during the advance care planning process, limited attention has been given to the associated stressors of family caregivers. Previous studies report inadequate stress management and role conflict as substantial contributors to family caregiver burden, but the extent to which religious strength serves as a coping mechanism in alleviating caregiver strain and anxiety remains unclear. We hypothesized that caregivers with stronger of faith would have lower levels of caregiver strain and lower levels of burden. We additionally aimed to evaluate whether caregiver strain was associated with socio-demographic characteristics, including education, gender, ethnicity, marital status, and age.

METHODS: We recruited 92 severely ill patients from Brigham and Women's Hospital and Penn State Hershey Medical Center. Patients were included if they had a likely prognosis of less than 2 years with one of the following diagnoses: advanced cancer, severe congestive heart failure (New York Heart Association Class III or Class IV), severe lung disease (Stage III or Stage IV COPD by modified GOLD Spirometric Classification), or End Stage Renal Disease. We measured caregiver strain with a validated 12-item Zarit Burden Interview (ZBI) short form and a caregiver strain index form (FSI) comprised of 13 yes/no questions assessing the caregiver's role and associated experiences. Both the ZBI and the FSI were administered to the caregiver during the first visit (ZBI+FSI pre-intervention) and subsequently administered 8–12 weeks after the second visit through a phone interview (PI+ZBI+FSI post-intervention). Socio-demographic information was collected for all subjects. Descriptive analyses and ANOVA was used to assess predictors of caregiver burden and strain.

RESULTS: The mean age of caregivers (CG's) was 58 years ($SD \pm 14$), while the mean age of patients was 63 years ($SD \pm 14$). Fifty-one percent of patients had cancer, 24 % ($n = 42$) had COPD, 21 % ($n = 36$) had CHF, and 4 % ($n = 6$) had ESRD. Seventy-six percent of CG's were white ($n = 70$) and 13 % of were Black ($n = 12$). Sixty-nine percent of CG's ($n = 64$) reported having a strong religious faith, while 31 % ($n = 29$) reported having weak or no religious faith. ANOVA for pre and post intervention phone interviews showed that the mean change in family strain (FSI) (0–13, higher=more strain) was $2.88(95\% \text{ CI } 1.72-4.04)$ for unemployed caregivers ($n = 45$) as opposed to $1.00(95\% \text{ CI } .07-1.93)$ for employed caregivers ($n = 47$) ($P = 0.01$). ANOVA additionally revealed the following for pre and post intervention phone interviews: the mean change in family strain (FSI) between male CG's ($n = 27$) and female CG's ($n = 66$) was 2.83 and 1.37, respectively ($P = 0.065$). The mean change in family strain (FSI) between CG's who were married ($n = 66$) was $1.69(95\% \text{ CI } .87, 2.51)$ and $2.43(95\% \text{ CI } 0.17, 4.68)$ for CG's who were not married. The mean change in family strain (FSI) was $1.62(95\% \text{ CI } .90, 2.34)$ for CG's who made no important medical decisions for their loved ones ($n = 34$) as opposed to a mean change in family strain of $4.33(95\% \text{ CI } 2.38, 6.29)$ for CG's who did make an important medical decision for their loved one ($n = 7$) ($P = 0.03$). There was no significant

association between change in family strain and strength of religious faith, age, education, and ethnicity.

CONCLUSIONS: Strength of faith, contrary to our hypothesis, was not associated with change in CG strain in the pre and post-intervention phone interview. However, change in CG strain increased for CG's who had been involved in making an important medical decision. Interestingly, change in CG strain was higher for men than women, and was lower for CG's that are married and employed as opposed to CG's that are not married and unemployed. Our findings suggest that CG strain is dynamic and not only correlative with a patient's severity of illness or level of involvement in medical decisions. Caregiver gender, marital and employment status also contribute to differences in CG strain. Health care providers will be able to better support family caregivers if they are aware of the multiple factors contributing to CG strain while caring for patients at the end-of-life.

CENTOR SCORE PREDICTS COMMON BACTERIAL CAUSES OF SORE THROAT—NOT JUST GROUP A BETA HEMOLYTIC STREPTOCOCCUS.

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BACKGROUND: Group A beta hemolytic streptococcus (GAS), *Fusobacterium necrophorum*, and group C/G beta hemolytic streptococcus cause pharyngitis. However, whether Centor score predicts all such bacterial infections is unknown. We sought to determine whether Centor score also stratifies risk of bacterial infection in young adults with sore throat and to explore whether revised weights increased discrimination.

METHODS: In a prospective, cross-sectional study, students aged 15–30 years presenting to a student health clinic with acute sore throat were tested with polymerase chain reaction from throat swabs to detect the three bacteria. We calculated the Centor score by assigning one point each of four indicators (fever history, lack of cough, anterior cervical adenopathy and tonsillar exudates) prospectively collected and computed the Area Under the Receiver Operating Curve (AUROC). We then revised the Centor score weights based on logistic regression odds ratios [OR].

RESULTS: The prevalence of bacterial infection was 34 % (106/312). Each of the four Centor criteria significantly correlated with bacterial pharyngitis: fever history (OR 1.7; 95 % confidence interval [CI], 1.0 to 2.8; $p=0.04$), lack of cough (OR 2.1; 95 % CI, 1.3 to 3.4; $p=0.003$), anterior cervical adenopathy (OR 1.7; 95 % CI, 1.0 to 2.8; $p=0.04$), or tonsillar exudates (OR 3.1; CI, 1.7 to 5.7; $p<0.001$). The AUROC was 0.66 (95 % CI; 0.60 to 0.73). The risk of bacterial infection increased as the Centor score increased ($p<0.001$, Chi square for trend). For example, patients with scores 2–4 were twice as likely to have a bacterial pathogen (44 %, 74/169) as compared to patients with scores 0–1 (22 %, 32/143) ($p<0.001$). A new logistic regression analysis yielded these weights: 1 for fever history, 2 for lack of cough, 2 for anterior cervical adenopathy, and 3 for tonsillar exudates. The risk of bacterial infection also increased as the revised Centor score increased ($p<0.001$, Chi square for trend); scores 0–2 (22 %, 30/138), scores 3–5 (38 %, 51/133), and scores 6–8 (61 %, 25/41). However, the AUROC did not differ from the original criteria.

CONCLUSIONS: The Centor score stratifies the risk of any of 3 bacteria causing pharyngitis—(*F. necrophorum*, group A and group C/G beta hemolytic streptococci)—among young adults patients with sore throat.

CHANGE IN CARDIOMETABOLIC RISK FACTORS WITH POSTPARTUM CHANGES IN WEIGHT AND WAIST CIRCUMFERENCE IN WOMEN WITH RECENT GESTATIONAL DIABETES

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BACKGROUND: Women with gestational diabetes (GDM) have increased risk for the development of type 2 diabetes (T2DM) and cardiovascular disease (CVD), as well as high risk for repeat GDM. Although studies in older women suggest that weight loss may improve cardiometabolic risk factors, little is known about how weight changes modify these risk factors in the postpartum period. Some cohort studies suggest that women with GDM, despite their increased risk, do not lose weight and may even gain weight in the postpartum period. Given that cardiovascular disease and diabetes are the second and eighth leading causes of death, respectively, among women 45–54, the first decade following the childbearing decades, earlier weight changes may be important.

METHODS: In the *Balance after Baby (BAB)* trial of 75 women with recent GDM, women randomly allocated to a web-based year-long lifestyle intervention program lost significantly more weight than the control group. There was no significant impact of the intervention to decrease cardiometabolic risk factors. However, there was a large range of weight change in both groups (–16 kg to +10 kg). For this analysis, we sought to

determine if weight changes in the postpartum year were associated with changes in risk factors for T2DM and CVD, regardless of group assignment. In the *BAB* trial, we measured weight, height, waist circumference, blood pressure, fasting lipids, hsCRP, IL-6, fasting insulin, adiponectin, and conducted 75 g 2-h oral glucose tolerance tests at 6 weeks, 6 months, and 12 months postpartum. For this analysis, we include 59 women providing fasting blood samples at both 6 weeks and 12 months postpartum. We used JMP 11 Pro to conduct Spearman's correlations to determine the relationship between weight change and change in markers of cardiometabolic risk.

RESULTS: Among 59 participants, the mean age was 33±5 years; 6 week postpartum BMI was 31±6 kg/m²; and 58 % were White, 31 % African-American, 12 % Asian; with 20 % Hispanic. Median weight change from 6 weeks to 12 months postpartum was +0.4 kg (IQR –4.8 kg, +2.7 kg) and median change in waist circumference was –1.4 cm (IQR –7 cm, +2 cm). Changes in weight from 6 weeks to 12 months postpartum significantly correlated with changes in several T2DM risk factors: HbA1c (Spearman's $r=0.45$, $p<.001$), fasting glucose ($r=0.41$, $p<.005$), fasting insulin ($r=0.49$, $p<.001$), homeostasis model assessment of insulin sensitivity (HOMA) ($r=0.5$, $p<.001$), and adiponectin ($r=-0.38$, $p<.005$). Among CVD risk factors, weight changes were significantly correlated with changes in fasting triglycerides (Spearman's $r=0.28$, $p<.05$), but not with other CVD risk factors including blood pressure, LDL, or HDL, nor with the inflammatory markers hsCRP and IL-6. Changes in waist circumference significantly correlated with changes in HbA1c ($r=0.36$, $p<.01$), fasting insulin ($r=0.38$, $p<.005$), HOMA ($r=0.38$, $p<.005$), HDL ($r=-0.31$, $p<.05$), and hsCRP ($r=0.28$, $p<.05$).

CONCLUSIONS: Weight changes and changes in waist circumference in the postpartum period were significantly correlated with changes in certain cardiometabolic risk factors among women with recent GDM. Given the high risk for T2DM, CVD, and repeat GDM in this population, weight gain or loss, even in the first year postpartum, may have substantial impact on the development of future disease. Longer studies are needed to determine how postpartum weight changes affect the rate of development of T2DM, CVD, and repeat GDM. Supported by: CDC MM-1094-09/09; NIH BIRCWH 5K12HD057022-08; NIH NCAAM T32AT000051; NIH NHLBI K24HL096141

CHAOS AND CLINICAL COMPETENCE: ASSESSING THE INFLUENCE OF THE "BUSY-NESS" OF THE CLINIC ON RESIDENT PHYSICIANS' CORE CLINICAL COMPETENCE: USING UNANNOUNCED STANDARDIZED PATIENTS

Colleen Gillespie; Irina Nudelman; Kathleen Hanley; Amara Shaker-Brown; Ellen Wagner; Lisa Altshuler; Adina Kalet; Sondra Zabar. NYU School of Medicine, New York, NY. (Tracking ID #2198729)

BACKGROUND: Clinic functioning has been shown to influence quality of care. Less is known, however, about whether clinic functioning affects physicians' core clinical skills such as communication. In addition, residency training may not focus sufficiently on preparing residents for maintaining their competence in challenging clinical settings. We explore association between the functioning of the primary care clinic and medicine residents' core communication skills using Unannounced Standardized Patient (USP) visits as a method uniquely suited to capture both physician communication competence and in-the-moment "busy-ness" of the clinic.

METHODS: Three hundred three USP visits, focusing on 5 different common primary care clinical scenarios for new patients, were delivered to 120 medicine residents across two primary care clinics. Highly trained SPs showed up to the clinic as new patients, saw the resident physician, and completed a comprehensive assessment of both the functioning of the clinic, including clinic staff, and the competence of the resident physician in the core domains of communication, assessment, counseling, physical exam, treatment plan, and patient activation. Analyses focus on a single-item measure of how busy the clinic was ranging from 1-not busy at all to 5-hectic/chaotic with the midpoint of 3 anchored as busy but reasonable. Resident competence in communication was assessed using 14-items with behavioral anchors for not done, partly done and well done response options that included 3 sub-domains: information gathering, relationship development, and education/counseling. Summary scores were calculated as percent of items rated as well done and each domain and sub-domain score met minimum criteria (.80) for internal consistency.

RESULTS: Twenty-four percent of visits were rated as "calm", 22 % as between "calm" and "busy but reasonable", 41 % as "busy but reasonable", 11 % as between "busy but reasonable" and "hectic/chaotic" and 2 % as "hectic/chaotic" (overall mean=2.45, SD 1.03; 5-point scale). Mean overall communication scores differed significantly by chaos measure ($F=6.22$, $p=.013$) with those scores assessed on days that were rated as more than "busy but reasonable" being significantly lower than those assessed on days when the clinic was less busy (means for each value of the chaos measure: 1=64 %; 2=60 %; 3=58 %; 4=51 %; 5=44 %). Scores for the sub-domains of communication showed similar trends (information gathering $F=6.22$, $p=.013$); relationship development $F=7.26$, $p=.007$; patient education $F=3.38$, $p=.067$). Correlations supported these findings as a small but significant linear relationship was found between clinic chaos scores and overall

communication performance Spearman's ($r=-.11, p<.05$) and was slightly larger for relationship development ($r=-.15, p<.05$).

CONCLUSIONS: Resident physicians' communication performance in primary care visits was found to be negatively associated with clinic chaos—the busier the clinic, the lower their communication scores. Both assessments were made by the USP and so one limitation of our data is that some of this association could be due to the chaos of the clinic affecting the USP's rating. However, our results suggest that 1) preparing residents to communicate effectively even on more hectic, chaotic days may be one goal of training programs and 2) quality of communication at the individual provider level can be enhanced by improving the functioning of the clinic.

CHARACTERIZATING THE END OF LIFE CARE FOR THE UNINSURED AND UNDOCUMENTED IMMIGRANT PATIENTS IN A CITY HOSPITAL CENTER Janeen Marshall¹; Tita Castor^{2, 1}; Sapna Shah^{2, 1}; Nisha Viswanathan¹; Ali-John Zarabi¹. ¹The Mount Sinai Hospital, New York, NY; ²Elmhurst Hospital Center, Elmhurst, NY. (Tracking ID #2199239)

BACKGROUND: In 2014 the WHO mandated that access to palliative care and hospice be accessible for all. Here in the US care for the uninsured and undocumented (UAI) patients continues to be a struggle for many health systems yet limited data is available regarding the provision of service, clinical course and outcomes for these patients in need of palliative care and hospice services.

METHODS: Clinical and demographic data from UAI patients followed by the Palliative Care Consult Service (PCCS) at Elmhurst Hospital Center from 12/1/2013-11/30/2014 was obtained on intake to the service. Undocumented status was indicated on initial intake form and uninsured status was verified by chart review. The diagnoses, reason for consult, length of stay, PCCS interventions provided and discharge disposition were analyzed.

RESULTS: Four hundred twenty-eight total patients were referred to the PCCS. 40.2 % were 18–65 years old and 59.8 % were >65 years old. 49.8 % were Female. Approximately 11 % of these patients died within 2 days of completion of their PCCS consultation. Fourteen percent patients were identified as to be uninsured and undocumented. The most common reason for consult for these patients was discharge planning/placement and for 4 of these patients the ultimate determination was that they would remain in the city hospital until their death due to their lack of insurance and undocumented status. Mean number of days between admission and PCCS consultation for these patients was 7.4 days. Five percent of all PCCS patients remain hospitalized for more than 30 days after admission and 7 % remain after PCCS consultation.

CONCLUSIONS: To date very little data on the experience of undocumented and uninsured patients exists outside of anecdote and case report. Characterizing the end of life care in the uninsured and undocumented patients provides much needed data in assuring that hospital systems are able to provide palliation and discharge to appropriate care systems for this vulnerable population.

CHRONIC BENZODIAZEPINE PRESCRIBING IN AN ACADEMIC PRIMARY CARE CLINIC Maria Fan²; Scott Steiger¹. ¹UCSF, San Francisco, CA; ²University of California, San Francisco, San Francisco, CA. (Tracking ID #2195005)

BACKGROUND: Chronic benzodiazepine use is geographically variable and associated with several harms, including dementia, falls, hip fractures, increased mortality, and possibly cancer. There is growing interest in reducing chronic benzodiazepine use, particularly in high-risk populations such as the elderly. In this study, our objective was to characterize chronic benzodiazepine prescribing patterns in an academic primary care clinic.

METHODS: We performed a cross-sectional study of patients receiving chronic benzodiazepines at the University of California, San Francisco, General Internal Medicine Practice. We queried the electronic health record (EHR) to identify all patients who received two or more outpatient prescriptions for any benzodiazepine between 7/1/2013 and 8/25/14. We reviewed the charts of identified patients to determine the indication for prescribing. Demographic information, prescribed benzodiazepine amounts, co-morbid diagnoses, concomitant hypnotic and anti-depressant prescription, and urine drug testing information was extracted through EHR query. Mean 10-mg diazepam daily dose equivalents were calculated based on total number of tablets prescribed in the specified time frame, including refills. Descriptive statistics were calculated for the group of patients receiving chronic benzodiazepines and compared to descriptive statistics for the practice as a whole.

RESULTS: There were a total of 634 patients identified as receiving chronic benzodiazepines out of a total practice population of 26,805 patients (2.4 %). The mean age of patients prescribed chronic benzodiazepines was 58 years, with a range of 24 to 95 years. Thirty four percent of patients prescribed chronic benzodiazepines were aged 65 years or

older, compared to 27 % of the overall clinic population aged 65 or older. The most common indications for benzodiazepine prescriptions were anxiety (64 %) and insomnia (16 %) (Table 1). The mean 10-mg diazepam daily dose equivalent for the cohort was 1.47, with a range of 0.01 to 32.55. Forty-five percent of patients receiving chronic benzodiazepines were co-prescribed an anti-depressant. 23 % of patients receiving chronic benzodiazepines also received chronic opiates, compared to only 3 % of patients in the total practice population receiving chronic opiates. Fourteen percent of patients receiving chronic benzodiazepines had received urine drug testing at least once in the past year. Three percent of patients receiving chronic benzodiazepines had diagnoses of dementia or cognitive impairment.

CONCLUSIONS: Prevalence of chronic benzodiazepine prescribing in this academic primary care clinic was lower than recently reported national data, though our study was limited to prescriptions by primary care providers. Of patients receiving chronic benzodiazepines, a third were older than 65 years and a higher proportion of patients were simultaneously prescribed chronic opiates than compared to the general clinic population. This study characterizes prescribing patterns for chronic benzodiazepines in an academic primary care practice and identifies several potential areas for improving prescribing safety for chronic benzodiazepines.

Indications for benzodiazepine prescriptions

Indication*	Number of patients (%)
Anxiety	409 (64 %)
Insomnia	104 (16 %)
Muscle spasms	22 (3.5 %)
Anxiety or insomnia	21 (3.3 %)
No indication provided	16 (2.5 %)
Pain	11 (1.7 %)
Panic symptoms	9 (1.4 %)
Depression	6 (0.95 %)
Seizures	6 (0.95 %)
Anxiety or pain	4 (0.63 %)
Anxiety or depression	4 (0.63 %)
Stress	3 (0.47 %)
Bipolar disorder	2 (0.32 %)
Nausea and vomiting	2 (0.32 %)
Agitation	2 (0.32 %)
Dizziness	2 (0.32 %)

* Additional indications for which only one patient received a prescription in each category: paranoia; PTSD; insomnia or stress; anxiety or PTSD; anxiety or seizures; anxiety, insomnia, or tinnitus; REM sleep disorder; tics; dystonia; restless leg syndrome; and abdominal cramping.

CLINICAL CHARACTERISTICS OF UNDOCUMENTED IMMIGRANTS WITH HIV IN BRONX, NY Jonathan Ross²; David B. Hanna¹; Uriel R. Felsen²; Viraj V. Patel^{1, 2}. ¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2193701)

BACKGROUND: An estimated 11.7 million immigrants living in the United States are undocumented, yet there is almost no information about how this population is affected by the human immunodeficiency virus (HIV). We sought to describe demographic and clinical characteristics of HIV-positive undocumented immigrants and to determine whether immigration status is associated with certain HIV-related outcomes.

METHODS: We conducted a retrospective cohort study of HIV-positive patients receiving care in a large urban health care system in the Bronx, NY, a county with an extremely high HIV prevalence of 1.7 %. We included patients whose medical records were available in a database of HIV-positive adults receiving care in our system, and who entered care between January 1, 1997 and December 31, 2013. To identify undocumented immigrants we searched the database for individuals who had no social security number and whose only medical insurance was provided by programs who offer services to patients regardless of immigration status, with a subset of these patients undergoing chart review to validate documentation status. Undocumented immigrants were compared to controls matched by age, sex, race/ethnicity and date of entry to care. The chi-squared test was used to compare undocumented immigrants and matched controls for HIV transmission risk factor and achievement of virologic suppression, while the signed-rank test was used to compare CD4 count on entry to care.

RESULTS: Out of 15,134 HIV+ adults with available records in the database, 151 patients (1.0 %) were identified as undocumented. The majority were male (108, 71.5 %) and Hispanic (84, 55.6 %), with a median age at entry to care of 37 years (range 18–77). Among patients with available data on HIV risk factor, only 2.0 % of undocumented immigrants reported a history of injection drug use compared to 10.6 % of

matched control patients ($P=0.01$). Median CD4 count at entry to care was 325 cells/uL (interquartile range 143–434) for undocumented immigrants and 374 cells/uL (interquartile range 135–534) for matched controls ($p<0.01$). Among patients with detectable viral loads at care entry who were followed for at least 90 days, 48.9 % of undocumented immigrants achieved virologic suppression by their last available viral load within one year compared to 47.4 % of matched controls ($P=0.84$).

CONCLUSIONS: Undocumented immigrants represent a small but important population of HIV-positive patients. Compared to matched controls, undocumented patients presented with more advanced disease; however, rates of virologic suppression were similar in both groups. This study included only patients with health insurance, and the results may not be generalizable to undocumented immigrants who are uninsured. Our findings suggest that in a setting where health insurance is available to undocumented immigrants, similar HIV-related outcomes may be achieved regardless of immigration status.

CLINICAL DECISION-MAKING AROUND THE GENOME SEQUENCING RESULTS OF HEALTHY ADULTS: PRELIMINARY RESULTS FROM THE MEDSEQ PROJECT Jason L. Vassy^{3, 2}; Kurt D. Christensen²; Jill Oliver Robinson¹; Michael F. Murray⁴; Amy L. McGuire¹; Robert C. Green². ¹Baylor College of Medicine, Houston, TX; ²Brigham and Women's Hospital and Harvard Medical School, Boston, MA; ³VA Boston Healthcare System, Boston, MA; ⁴Geisinger Health System, Danville, PA. (Tracking ID #2184434)

BACKGROUND: Excitement and controversy surround the potential use of genome sequencing (GS) as a screening tool for preventive care among healthy, asymptomatic adults. Knowledge of one's genetic makeup might guide personalized health screening and decision-making. However, the clinical significance of most of the 3–5 million variants that GS can identify remains unknown. Introducing GS to the clinical care of asymptomatic patients may thus increase healthcare costs but not value. Patient harm may also result if incidentally identified genetic variants with uncertain impact on human health precipitate unnecessary diagnostic and therapeutic procedures. To inform the research questions necessary to evaluate the role of GS in preventive medicine, we aimed to describe the clinical decision-making of primary care physicians (PCPs) around the GS results of their generally healthy patients.

METHODS: The MedSeq Project is an ongoing trial of integrating GS into primary care. We have enrolled PCPs from a network of practices at one academic center to participate in the study

with their patients. Patients are eligible for enrollment if they are 40–65 years old, do not have cardiovascular disease (CVD), diabetes, or significant anxiety or depression, and are deemed generally healthy by their PCPs. Patients are randomized to receive either 1) a comprehensive family history report (FmHx arm) or 2) this FmHx report plus an interpreted GS report (FmHx+GS arm). The GS reports include any concerning variants found in genes associated with monogenic disease, carrier states for autosomal recessive disorders, pharmacogenetic associations for the efficacy or safety of certain medications, and polygenic risk estimates for certain common diseases such as coronary disease and type 2 diabetes. A clinic visit is scheduled for the PCP and patient to meet, discuss the results, and determine the next steps in clinical management. One week after this visit, the PCP completes a brief survey asking him or her to identify any laboratory tests, cardiology tests, imaging tests, and referrals ordered as a result of the patient's FmHx and/or GS reports, in addition to the specific FmHx and/or GS result(s) prompting him or her to do so. Similarly, the PCP identifies any medication or health behavior changes recommended. For each FmHx+GS patient, the PCP reports on a 5-point Likert scale (from "Strongly disagree" to "Strongly agree") whether he or she agrees with the statement "The genome report improved the overall clinical care of this patient beyond what the family history report alone could have achieved."

RESULTS: Among 48 of 100 planned patients who have undergone results visits to date, the mean age was 54 years, 54 % were women, and 10 % were non-white or Hispanic. The table shows the clinical actions taken by these patients' 7 PCPs. The PCPs reported that the FmHx +/- GS reports prompted no additional clinical actions for 69 % of the patients overall but did prompt actions in 24 and 39 % of the FmHx-only and FmHx+GS arms, respectively ($p=0.26$). PCPs have ordered laboratory tests (2 vs. 2) and referrals (3 vs. 3) for as many patients in the FmHx-only arm as in the FmHx+GS arm. However, they tend to evaluate and manage potential CVD risk more aggressively in the FmHx+GS arm, as indicated by more recommendations for health behavior change and aspirin administration. PCPs disagreed that GS improved clinical care beyond FmHx alone for 10 patients (43 %) in the FmHx+GS arm, while they agreed for 9 (39 %).

CONCLUSIONS: Preliminary results from The MedSeq Project suggest that introducing GS to preventive medicine may impact clinical management compared to a FmHx assessment alone without increasing overall utilization of services. Future research should examine inter-provider variability and determine the appropriateness of such clinical actions, as measured by their impact on patient outcomes and cost to the healthcare system.

	Family History Only (n=25)	Family History + Genome Sequencing (n=23)
Laboratory tests	2	2
	BRCA testing (FmHx of breast cancer) C-reactive protein, homocysteine, lipoprotein A (FmHx of heart disease)	Repeated genetic testing (Monogenic risk for variegate porphyria) Iron, ferritin (Hemochromatosis carrier state)
Imaging studies	0	1
		Abdominal ultrasound (Polygenic risk for abdominal aortic aneurysm)
Cardiac studies	0	2
		EKG (Monogenic risk variant for Romano-Ward syndrome/long QT) Exercise stress test (Polygenic risk for coronary artery disease)
Referrals	3	3
	Genetic counseling (FmHx of breast cancer) Genetic counseling (FmHx of lung and esophageal cancer) Neurology (FmHx of Lewy body dementia)	Genetic counseling (Variant of unknown significance in a cardiomyopathy gene and carrier state for dermolytic bullous dystrophica) Genetic cardiologist (Monogenic risk variant for Romano-Ward syndrome/long QT) Genetic dermatologist (Monogenic risk for variegate porphyria)
Medication changes	0	3
		Begin aspirin 81 mg (FmHx and polygenic risk for coronary disease) Begin aspirin 81 mg (FmHx and polygenic risk for coronary disease) Begin aspirin 81 mg (FmHx and polygenic risk for coronary disease)
Health behavior recommendations	3	5
	Weight loss (FmHx of breast cancer) Weight loss (FmHx of coronary disease, hypertension, and hyperlipidemia) Smoking cessation (FmHx of coronary disease and cancer)	Diet and exercise (FmHx and polygenic risk of coronary disease) Diet and exercise (Polygenic risk for coronary disease and diabetes) Attention to medication choice (Monogenic risk variant for Romano-Ward syndrome/long QT) Healthy lifestyle (FmHx of heart disease and polygenic risk for coronary disease) Weight loss and exercise (Unspecified polygenic risk)

Counts of clinical actions made by PCPs in the care of their generally healthy adult patients randomized to receive a FmHx assessment only or a FmHx assessment plus genome sequencing. Parentheticals refer to result(s) identified by the PCP as prompting each clinical action.

CLINICAL IMPACT OF POST-DISCHARGE PHONE CALLS USING INTERACTIVE VOICE RESPONSE SYSTEM. Kelly A. Fung; Leah S. Karliner. UCSF, San Francisco, CA. (Tracking ID #2199500)

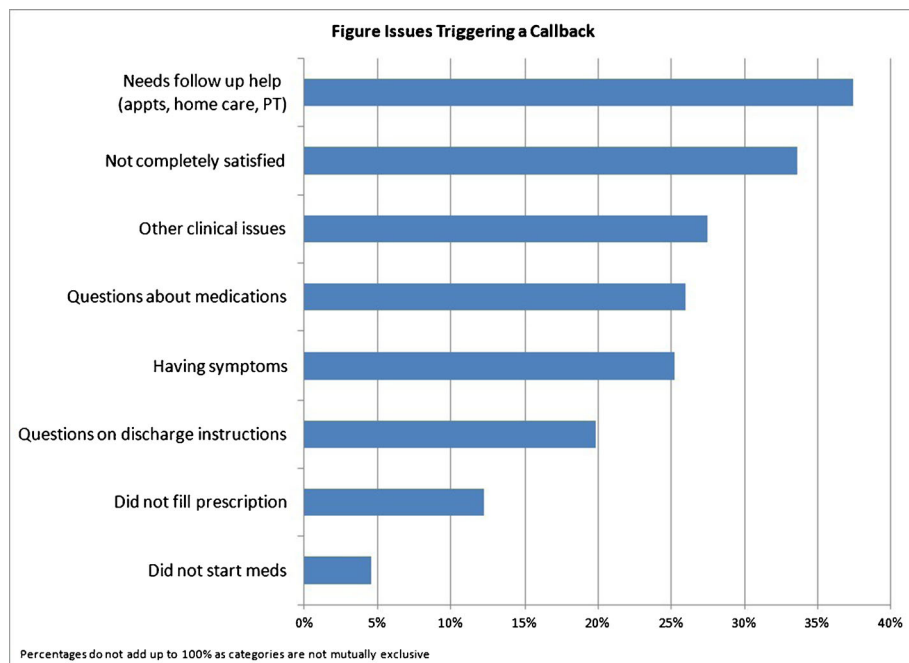
BACKGROUND: Post-discharge follow-up phone calls have been used to coordinate care in the transition period from hospital to home. These call programs have been limited because they are time and staff intensive. Interactive voice response systems (IVRS) enable a large number of patients to be called shortly after discharge with the potential of identifying and directing staff time to call those patients with post-discharge needs. We set out to determine how effective a post-discharge IVRS system is at reaching patients and identifying those with needs, and the impact reaching patients has on follow-up appointment attendance.

METHODS: We conducted a cohort study of established primary care patients at an urban academic medical center who were discharged to home from the Medicine service from December 2013 through September 2014 and had telephone contact information at the time of discharge. The IVRS was programmed to call patients and administer a simple survey 24 to 72 h after discharge. The survey's objective was to identify all patients having new or worsening symptoms, problems filling prescriptions or starting medications, questions about medications, problems with follow-up appointments, questions on discharge instructions, or dissatisfaction with their hospital stay. All patients flagged by the IVRS as having any of these concerns were then telephoned by a nurse to clarify and address the

problem(s). Patients were considered reached by the IVRS if they were able to identify themselves as the patient or caregiver and answer at least the first question of the survey. We used adjusted logistic regression models to examine the association between patient demographics (age, sex, payor, race/ethnicity, preferred language) and being reached by the IVRS. Additional models examined the association between IVRS reach and arrival to a scheduled primary care follow-up appointment within 14 days of discharge, adjusting for the same demographics.

RESULTS: Of 849 eligible discharges, 492 (58 %) were reached by the IVRS. Among those reached, 427 (87 %) answered all the survey questions, and 262 (53 %) triggered a call back from a nurse. The most common issue triggering a callback was need for help with follow-up (Figure). In multivariate analysis, the odds of being reached were higher for older patients (AOR Age 40–65 1.65, 95 % CI 1.05–2.69; Age >64 1.87, 95 % CI 1.09–3.21), and lower for patients with Medicaid insurance (AOR 0.43, 95 % CI 0.29–0.65). Overall, 516 (61 %) attended a primary care follow-up appointment within 14-days of discharge; this significantly differed between those in the 'reached' and 'not-reached' group (65 % vs. 55 %; $p=0.004$). Patients in the 'reached' group had higher odds of arriving to their 14-day follow-up appointment (AOR 1.48, 95 % CI 1.11–1.97).

CONCLUSIONS: Post-discharge IVRS phone calls are effective in identifying immediate follow-up and clinical needs of those patients who are reached and directing nurse phone call time to those patients with needs, as well as improving follow-up appointment attendance rates. However, a large proportion of patients are never reached, with a disproportionate number of Medicaid patients not being reached, and it is unknown how many of those patients have needs. Future efforts should examine risk stratification of patients with greatest socioeconomic and clinical vulnerability post-discharge to a real-time nurse call if they are not reached by the IVRS.



CLINICAL MANIFESTATION OF OSTEOARTICULAR TUBERCULOSIS AND ITS RELATIONSHIP TO COMPLICATION OF PULMONARY TUBERCULOSIS: A RETROSPECTIVE STUDY IN TWENTY-NINE CASES

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BACKGROUND: Osteoarticular tuberculosis, including spinal tuberculosis, is a rare clinical condition, but its incidence is increasing as a result of large proportion of the older patients with chronic debilitating disease,

especially in Japan. With early diagnosis and prompt treatment, the prognosis of osteoarticular tuberculosis is generally good. However, delay in diagnosis may lead to spread of the infection from bone into adjacent neural structures, joints and surrounding soft tissue that leads to significant functional disability and joint deformity. Patients with osteoarticular tuberculosis are frequently unaccompanied by pulmonary lesion, and chronic back pain is often only symptoms in patients with spinal tuberculosis. In the early stages of the disease, radiological imaging studies and laboratory tests are inconclusive, and the determination of the diagnosis is extremely difficult. The purpose of this study is to investigate the clinical features and outcome of osteoarticular tuberculosis and to clarify its relationship to complication of pulmonary tuberculosis.

METHODS: This is a retrospective study including all patients who were diagnosed as osteoarticular tuberculosis in our institution between January 1999 and October 2013. The diagnosis of osteoarticular tuberculosis was based on (1) the radiological findings and (2) the detection of *Mycobacterium tuberculosis* from either sputum, or the bone lesion, or both.

RESULTS: Twenty-nine patients were included, including 13 male and 16 female (ratio 1: 1.2). The mean age of patients was 75.2 ± 14.8 years old (range, 26 to 91 yd). Location of the disease was cervical (1 case), dorsal (13 cases), lumbar (11 cases), knee joint (1 case), hip joint (1 case), hand joint (1 case) and metacarpal bone (1 case). The most common symptoms at presentation were back pain or joint swelling (69 % of all cases) followed by fever elevation (28 % of all cases). In 25 cases with spinal tuberculosis, 8 cases demonstrated paraplegia. The most frequent manifestations of pulmonary lesion were military tuberculosis (41 % of all cases), while 6 cases (21 % of all cases) demonstrated normal chest CT findings. The positive rate of sputum smears for acid-fast bacilli was lower in patients with osteoarticular tuberculosis than that of in all of tuberculosis patients treated in our institution (41 % vs 64 %). Patients who were smear-negative in the sputum for acid-fast bacilli had longer duration of doctor's delay in the diagnosis of osteoarticular tuberculosis compared to the counterparts of patients who were smear-positive (99.8 ± 30.1 days vs 29.1 ± 26.7 days, $P < 0.05$). The positive rate of sputum smears for acid-fast bacilli was lower in patients with paraplegia than that of patients without paraplegia (12.5 % vs 64.7 %, $P < 0.05$).

CONCLUSIONS: Our results indicated that patients of osteoarticular tuberculosis without complication of pulmonary tuberculosis resulted in delayed diagnosis and subsequent functional disability. Osteoarticular tuberculosis is still an important public health issue, and it should be always considered as a differential diagnosis in patients with chronic back pain or chronic joint swelling, even if the findings on a chest X-ray are normal and sputum smears for acid-fast bacilli are negative. A high index of suspicion, accurate diagnostic approaches including imaging techniques such as MRI and the histological and microbiological examination after needle aspiration biopsy, and prompt treatment are key for the successful management of osteoarticular tuberculosis.

CLINICAL OUTCOMES OF INVASIVE BEDSIDE PROCEDURES Cynthia Kay², Erica M. Wozniak¹. ¹Medical College of Wisconsin, Milwaukee, WI; ²Clement J. Zablocki Veterans Affairs Medical Center, Milwaukee, WI. (Tracking ID #2193261)

BACKGROUND: Bedside procedures, such as lumbar puncture, paracentesis and thoracentesis, are now generally referred for completion. Possible explanations for this include changes in residency procedure training, new duty hour rules, and the emergence of specialists equipped and trained to perform procedures. Our study's aim was to assess the outcomes of bedside procedures at an academic medical center by referral status.

METHODS: A retrospective chart review was done on paracenteses, thoracenteses, and lumbar punctures performed on adults admitted to a resident or hospitalist service at an academic medical center over a 1 year period. Referred procedures were done by either radiology or the hospital procedure service. Non-referred procedures were those performed by the resident or hospitalist team. Immediate complications were defined as pneumothorax, hemothorax, pneumoperitoneum, hemoperitoneum, hypotension, uncontrolled bleeding and pain. Delayed complications included transfer to the ICU, infection at procedure site, and bleeding beyond 2 h post-procedure. Immediate and delayed complications were combined to create a binary indicator for occurrence of complications that served as the primary outcome of interest in this study. Procedure cost, length of hospitalization, and time from the decision to perform a procedure until its completion were secondary endpoints. Logistic regression was used to create a propensity score model that matched referred and non-referred patients according to demographic and clinical characteristics. The study was approved by our institution's IRB.

RESULTS: There were 391 procedures reviewed, with a complication rate of 7 % ($n=23$ referred and $n=4$ not referred). For the primary outcome, logistic regression using propensity score matching found there was no difference in the risk of complications by referral status; however, the study was underpowered to detect such differences due to the low rate of complications. For the continuous secondary outcomes, linear regression with propensity score matching was used to control for observable confounders. We found that referral did not have a significant effect on length of hospitalization. Referral, however, significantly increased the time until a procedure was performed ($p=0.03$) and the cost of the procedure ($p<0.001$). To account for non-normality, length of hospitalization and time to procedure were log-transformed, and a square-root transformation was used for procedure cost.

CONCLUSIONS: The clinical outcome of complications was not different regardless of whether or not the procedure was referred. On the other hand, time until a procedure was performed and procedure cost were significantly more when referred to other services. These findings suggest that procedure performance remains an important skill to learn,

despite changes in residency requirements. We also propose that the usual practice of referring procedures should be reconsidered both for patient care and for health care costs.

CLINICAL PROVIDER EXPERIENCES WITH MEDICATION DISCONTINUATION Amy Linsky^{1, 2}, Steven R. Simon¹, Kelly Stolzmann¹, Mark Meterko¹. ¹VA Boston Healthcare System, Boston, MA; ²Boston University School of Medicine, Boston, MA. (Tracking ID #2197763)

BACKGROUND: While medication adherence and medication reconciliation receive considerable attention, there has been less focus on improving intentional, proactive discontinuation of medications that may no longer be necessary or whose benefits no longer outweigh associated risks. Clinicians vary in their experience and attitudes related to medication management decisions; some are quite comfortable discontinuing medications that lack a clear indication, whereas others prefer to continue therapies that are not causing identifiable problems for the patient. Through the development and administration of a nationwide survey of Department of Veterans Affairs (VA) primary care providers, we assessed attitudes toward and experiences with discontinuing medications.

METHODS: We sampled 2475 VA primary care providers with prescribing privileges, including physicians, nurse practitioners (NPs), physicians' assistants (PAs) and clinical pharmacists, for an online survey. Providers were asked about the prevalence of polypharmacy (i.e., 5 or more medications) in their patients, their experience and comfort level with deciding to recommend medication discontinuation to a patient and their opinions regarding various factors related to such decisions. We examined the range of responses on these questions and the bivariate associations between various provider demographic characteristics and their medication-relevant attitudes. We then used a backward elimination linear regression analysis to build a multivariable model identifying the provider factors associated with recommending medication discontinuation.

RESULTS: A total of 409 (17 %) of clinicians responded: 73 % were physicians, 17 % NP/PAs, and 10 % pharmacists. Study participants were mostly white (72 %), female (52 %), age ≥ 50 years (64 %), had 8 or more clinic sessions per week (52 %), had worked in VA for less than 10 years (53 %), and also had prior experience working outside of the VA (79 %). Non-responders were more likely to be physicians but were otherwise similar. Nearly all clinicians (92 %) indicated that at least 20 % of their patients take 5 or more medications regularly. Overall, 38 % of respondents reported that 40 % or more of their patients had a medication that could potentially be stopped, and 78 % indicated that at least 1 in 5 of their patients had a medication that might be discontinued. However, not all providers recommended discontinuation; among providers who identified patients taking a medication that could potentially be stopped, 11 % of providers recommended medication discontinuation to fewer than 20 % of candidate patients, while only 30 % recommended it for more than 80 % of candidates. In multivariable analyses, factors associated with recommending medication discontinuation included self-rated comfort level with medication discontinuation ($p < 0.0001$) and prior non-VA clinical experience ($p=0.048$).

CONCLUSIONS: Nearly all clinicians identified patients who had medications that could potentially be stopped, yet whether they actually made a recommendation to do so varied among providers. When providers fail to act upon opportunities for discontinuation, patients may continue to take medications with low potential benefit-to-risk ratios. Given that self-rated comfort with discontinuation and practice experience were associated with taking action, it is essential to understand the factors that contribute to comfort level in order to develop education and interventions that lead to safer prescribing patterns.

CLINICIANS' JUSTIFICATIONS FOR ANTIBIOTIC PRESCRIBING: A NEW TYPE OF QUALITY MEASURE Mark W. Friedberg^{1, 2}, Samuel Hirshman¹, Jason N. Doctor³, Daniella Meeker³, Jeffrey A. Linder². ¹RAND, Boston, MA; ²Brigham and Women's Hospital, Boston, MA; ³University of Southern California, Los Angeles, CA. (Tracking ID #2196370)

BACKGROUND: Nearly all measures of quality of care assess processes or outcomes of care that are not completely under individual clinicians' control. Moreover, such measures may not accurately reflect the quality of clinical reasoning. By assessing clinicians' justifications for prescribing antibiotics to patients with acute respiratory infections (ARIs), we sought to develop a new type of quality measure that directly assesses clinical reasoning—a construct that should be completely under individual clinicians' control.

METHODS: From November 2011 to October 2013, we exposed 81 Boston-area primary care clinicians to an electronic health record (EHR)-based intervention that asked them to justify, in a free-text window, their decision each time they prescribed an antibiotic to treat a patient's ARI. These justifications appeared as "Antibiotic Justification Notes" in the EHR, were viewable by other users, and contained default text stating "No justification was given" if prescribers did not enter a justification. Each time a justification was solicited, the EHR displayed guidelines from professional societies and the Centers for Disease Control and Prevention corresponding to the ARI for which the antibiotic was

being prescribed (non-specific upper respiratory infection, acute sinusitis, acute pharyngitis, or acute bronchitis). Two physician reviewers independently coded each antibiotic prescribing justification as “good” (a guideline-concordant antibiotic prescribing rationale; or a reason why the guideline does not apply) or “bad” (a guideline does apply but does not support the prescriber’s antibiotic prescribing rationale), resolving all disagreements by consensus. Each antibiotic prescription could have one or more distinct justifications; each was coded separately. For each clinician, we calculated a justification quality score: the percentage of antibiotic prescriptions having at least one good justification. We excluded clinicians who wrote fewer than 10 antibiotic prescriptions, accounted for varying per-clinician sample sizes using empirical Bayes shrinkage estimators, computed the measurement reliability (i.e., the “signal-to-noise ratio”) and 95 % confidence bounds of each clinician’s justification score, and assessed associations between clinician characteristics and justification scores using bivariate regression model.

RESULTS: The full sample of 81 clinicians wrote 3435 antibiotic prescriptions for ARIs. Physician reviewers’ independent assessments were identical for 81 % of justifications, and the remaining 19 % were coded by consensus. Sixty-three clinicians (54 physicians, 7 NPs, and 2 PAs) wrote 10 or more antibiotic prescriptions. Among these clinicians, 28 % of prescriptions had good justifications and 72 % had bad justifications (including 4 % of prescriptions for which clinicians entered no justification). The range of individual clinicians’ justification quality scores was 16 to 58 %. The most frequent type of bad justification was to report a symptom irrelevant to guidelines (e.g., hoarseness, malaise; 19 % of all justifications). Relative to the mean, 2 clinicians had justification quality scores that were statistically significantly lower and 14 had justification quality scores that were statistically significantly higher. The reliability of justification quality scores was >0.7 for 36 clinicians (57 % of the sample). The mean justification quality score was 33 % among physicians and 25 % among NPs and PAs ($P=0.11$ for difference). Justification quality scores were not statistically significantly associated with clinicians’ seniority (years since professional school graduation), full-time or part-time status, or rates of antibiotic prescribing for ARIs.

CONCLUSIONS: Using an EHR prompt to elicit justifications, it is possible to assess clinicians’ reasons for decision-making in patient care. For the decision to prescribe antibiotics for ARIs, justification quality scores had desirable measurement characteristics, including a wide range of scores, high reliability for a majority of primary care clinicians, and independence from underlying antibiotic prescribing rates—suggesting that justification scores may measure a distinct dimension of clinical performance.

CLOSING THE LOOP WITH AN ENHANCED REFERRAL MANAGEMENT SYSTEM Harley Ramelson^{1, 3}; Amanda V. Taube¹; Pamela M. Nerz². ¹Partners HealthCare, Wellesley, MA; ²Partners Healthcare Systems, Inc., Wellesley, MA; ³Brigham and Women’s Hospital, Boston, MA. (Tracking ID #2187686)

BACKGROUND: Outpatient referrals made by primary care physicians (PCPs) involve multiple sequential steps requiring provider-to-provider and provider-to-patient communication. Analysis of malpractice claims has shown that the referral process in the ambulatory setting is prone to incomplete follow-up and communication break-down.¹ An enhanced electronic referral management system (ERMS) was developed in an ambulatory EHR to meet a series of best practice steps for referral management.² The objectives of this study were to assess PCP and staff satisfaction with the ERMS and to evaluate whether PCPs and their practice staff would find it easier to complete individual steps in the referral process and whether they would find it easier to identify when a problem has occurred in the process.¹ Gandhi TK, Keating NL, Ditmore M, et al. Improving referral communication using a referral tool within an electronic medical record. *Advances in Patient Safety: New Directions and Alternative Approaches*. 2008;3:1–12. ² Hoffman J. Managing risk in the referral lifecycle. 2012; <https://www.rmf.harvard.edu/Clinician-Resources/Article/2012/SPS-Managing-Risk-in-the-Referral-Lifecycle>. Accessed January 5, 2015.

METHODS: The ERMS was launched in two separate releases in 2014. The first release focused on functionality to create, transmit and track referrals as well as the ability to indicate that a referral was complete (“close the loop”) and to identify when a referral was overdue. The second release primarily focused on a series of reports allowing retrospective analysis of referral patterns. This study enrolled nine ambulatory primary care practices affiliated with an integrated delivery system in the Northeast. Approximately 100 practice staff members, including physicians, medical assistants, nurses, and administrative staff involved in the referral process were recruited across these practices to participate in surveys and interviews conducted pre-and post-implementation of both releases. Data reported here reflect results of the surveys conducted at baseline and following the first release. Ease of use and usefulness of specific functions were evaluated on a five-point Likert scale while satisfaction was evaluated on a seven-point scale.

RESULTS: In the first 5 months following the release of the new ERMS module in the EHR, almost 3000 total referrals were generated. At baseline, 74 % reported that it was easy or fairly easy to create a referral. This increased to 91 % on the follow-up survey. At

baseline, 33 % reported that it was easy/fairly easy to schedule an appointment with a specialist. This increased to 64 % on the follow-up survey. At baseline, the percent who reported that it was easy/fairly easy to identify when an appointment was not made with the specialist, when an appointment was missed or when an appointment was cancelled was 34, 22 and 12 % respectively. These increased on the follow-up survey to 54, 45 and 36 %, respectively. When asked about their overall satisfaction with the referral process, 36 % of respondents reported they were satisfied or very satisfied at baseline compared to 92 % at follow-up. The new functionality was also assessed in the follow-up survey to determine the usefulness of 15 major new functions in the referral module. Nine functions were found by 90 % or more of respondents to be useful or somewhat useful. These include the following: 1. Ability to refer to a practice in addition to an individual specialist 2. Search functionality for a specialist 3. Favorite list of specialists and practices to whom PCPs commonly refer their patients 4. Supporting the intra-practice workflow of a staff person creating the electronic referral and sending to the PCP to authorize 5. Ability of the system to automatically fill in the appointment date based on interfaces with scheduling systems 6. Ability of the system to automatically link the specialist’s consult note to the referral based on the linkage with the notes module in the EHR 7. Ability of the system to identify when a referral is overdue at various stages in the referral life cycle 8. Ability to acknowledge the consult note in the referral module 9. Ability to document the closing of the referral

CONCLUSIONS: The results from the surveys after the new release of the enhanced referral management module show there is enhanced user satisfaction with the referral process and that most of the functionality was considered to be useful by a majority of the respondents. Users of the module found that previously difficult tasks such as the ability to identify when an appointment with the specialist was not made or missed or cancelled became easier with the new module. The implications for quality of care and patient safety are clear: when practice staff are able to track referrals in a more effective and efficient way and be able to intervene when appropriate, fewer patients will experience delayed specialty care potentially leading to improved patient satisfaction and patient safety.

CODE STATUS DISCUSSION AND FREQUENCY OF INAPPROPRIATE CARDIOPULMONARY RESUSCITATION AMONG TERMINALLY ILL HOSPITALIZED PATIENTS IN JAPAN. Akinori Sasaki²; Eiji Hiraoka¹. ¹Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Japan; ²Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Japan. (Tracking ID #2191504)

BACKGROUND: In the U.S.A., physician should discuss code status with all patients and officially order it when they are admitted to a hospital. On the other hand, it usually does not occur in Japan. Some doctors discuss it and others do not. We often observe inappropriate cardiopulmonary resuscitation (CPR) for terminally ill patients, including malignancy, dementia, and heart failure, etc. We also observe some physicians not perform CPR without discussion with patients if it appears to be futile or inappropriate. Because it has not been reported whether code status is discussed with patients on admission decreases the futile or inappropriate CPR for terminally ill patients.

METHODS: Objective: To explore the association between whether physicians discuss code status with patients on admission is associated with decrease futile CPR among patients with terminal illness. Design: retrospective cohort study Setting: One city hospital in Japan Patients: We included patients if they were admitted and died in Ito city hospital, Shizuoka, in Japan between April 1 and September 30 2014. Patients also should be terminally ill on admission. We use less than 70 points in Palliative Performance Scale (PPS) score as the definition of terminal cancer. And we use reference 1 for the definition of terminal stage of various diseases other than cancer. Main outcome: Whether cardiopulmonary resuscitation (chest compression for CPA), intubation with mechanical ventilation for pulmonary arrest, electrical cardioversion were performed was assessed as a main outcome. The incidence of these procedures were compared between in the presence and absence of discussion of code status on admission by chi square analysis. (1)Shelly R. Salpeter E.J.L., et al. Systematic Review of Noncancer Presentations with a Median Survival of 6 Months or Less. *Am J Med* 2012;125:e1-e16.

RESULTS: Eighty-one patients met the inclusion criteria. Code status was discussed on admission for 43 patients. It was not discussed for the remaining 38. Table 1 presents the characteristics in two groups. Both groups are similar except the rate of cerebrovascular accident. As shown table 2, the rate of CPR was 1.9 % in the group with whom the code status was discussed on admission and 14.6 % in the group with whom it was not discussed. The odds ratio was 9.0 (95 % confidence interval, 1.10–76.9). Intubation and central venous catheter placement occurred more frequently among no discussion group. Discussion: Code status discussion is routine process on admission in the U.S.A.; however it is not the case in Japan. It was shown here that even among terminally ill patients, code status was not discussed with 38 patients (46 %).

Not discussing code status on admission was associated with increase in incidence of CPR (OR 9.0). Code status discussion is likely to decrease unwanted CPR among terminally ill patients. One of the reasons is that probably most people would like to avoid futile aggressive care of CPR just to prolong life in Japan. Even if people would like full code on admission, the discussion of code status might give them a chance to rethink of the meaning of CPR and might change their code while hospitalization. To individualize the end of life care, we need to convey all information to the patients and discuss the end of life care, including code status in Japan. Limitation: this is small retrospective cohort study in one city hospital. Although it is definitely unethical to perform randomized controlled trial to investigate whether code status discussion decrease futile CPR, larger prospective observational study should be performed in Japan.

CONCLUSIONS: The code status discussion with terminally ill patients on admission is associated with decrease CPR before death. We need educate physicians about code status to improve end of life care.

Characteristics of study subjects

	Presence of code status discussion (43)	Absence of code status discussion (38)	P value
Age	81.8±11.0a	77.8±10.7	0.10
Gender			0.11
Male	23	27	
Female	20	11	
ADL^a	2.9±2.1 ^b	2.8±2.0 ^b	0.73
Primary diagnosis			
Cancer	20 %	13 %	
Liver disease	4 %	2 %	
Heart disease	3 %	5 %	
Neuromuscular disease	3 %	8 %	
Respiratory illness	10 %	8 %	
Geriatric syndrome	3 %	2 %	

aADL: activity of daily life

b: number of ADLs patients can perform independently out of 5 ADLs; dressing, eating, ambulating, toileting, hygiene.

Result

	Presence of code status discussion (43)	Presence of code status discussion (38)	P value	Odds ratio
CPR	1.9 %	14.6 %	.025	9.0[1.10–76.9]
Intubation	3.7 %	20.8 %	.012	6.8[1.40–33.3]
CVC	7.4 %	20.8 %	.081	3.3[0.96–1.12]
Cardioversion	0 %	0 %	–	–

CPR: cardiopulmonary resuscitation

CVC: central venous catheter

COMBINATION WEIGHT MANAGEMENT PHARMACOTHERAPY WITH LORCaserin AND IMMEDIATE RELEASE PHENTERMINE Steven R. Smith^{2,3}; W. Timothy Garvey¹; Frank L. Greenway⁴; William Soliman⁵; Sharon Zhou⁵; Randi Fain⁵; Ken Fujioka⁶; Louis Aronne⁷. ¹University of Alabama at Birmingham, Birmingham, AL; ²Sanford/Burnham Medical Research Institute at Lake Nona, Orlando, FL; ³Florida Hospital, Orlando, FL; ⁴Pennington Biomedical Research Center, Baton Rouge, LA; ⁵Eisai Inc, Woodcliff Lake, NJ; ⁶Scripps Clinic, La Jolla, CA; ⁷Weill Cornell Medical College, New York, NY. (Tracking ID #2198196)

BACKGROUND: Pharmacotherapy for weight management may involve combining drugs targeting different signaling pathways. This pilot study was sized to assess the primary outcome of impact of lorcaserin (LOR), a specific 5-HT_{2C} receptor agonist, and immediate release (IR) phentermine (phenIR) on pre-selected potentially serotonergic (5-HT) adverse events (AEs) compared to LOR alone.

METHODS: Two hundred thirty-eight patients with BMI >30 kg/m², or >27 kg/m² with a comorbidity, but without type 2 diabetes mellitus (T2DM), were randomized in a 12-week study comparing LOR 10 mg twice daily (BID) alone, LOR 10 mg BID with phenIR 15 mg QD (LOR/phenIR QD), or LOR 10 mg BID with phenIR 15 mg BID (LOR/phenIR BID). All received a standard diet and exercise program with adherence self-reported by study subjects. The primary endpoint evaluated whether short-term LOR/phenIR treatment is associated with exacerbation of potential 5-HT AEs compared to LOR alone. Secondary objectives included safety, tolerability, pharmacokinetics, and weight loss.

RESULTS: 37.2 % (LOR), 42.3 % (LOR/phenIR QD), and 40.5 % (LOR/phenIR BID) patients reported potential 5-HT AEs. 5.1 % (LOR), 2.6 % (LOR/phenIR QD), and 10.1 % (LOR/phenIR BID) patients discontinued due to AEs. At week 12, mean changes in blood pressure (systolic/diastolic) and pulse were –5.5/–2.5 mmHg and –1.9 bpm (LOR), –3.3/–1.4 mmHg and 1.1 bpm (LOR/phenIR QD), and –3.4/–1.7 mmHg and 3.1 bpm (LOR/phenIR BID). Mean change from baseline weight loss (kg/%) in 12-week completers was 4.0/3.8 (LOR), 7.6/7.3 (LOR/phenIR QD), and 8.9/8.7 (LOR/phenIR BID). 33.3 % (LOR), 68.2 % (LOR/phenIR QD), and 84.2 % (LOR/phenIR BID) patients achieved ≥5 % weight loss (12-week completers).

CONCLUSIONS: Treatment with LOR plus phenIR was not associated with exacerbation of potential 5-HT AEs compared to LOR alone. Common AEs during the trial were consistent with prior experience with these agents. The combination of LOR BID and phenIR BID more than doubled weight loss achieved compared to LOR alone.

COMBINED ANTIPLATELET AND ANTICOAGULANT THERAPY IN PATIENTS WITH ATRIAL FIBRILLATION—A DESCRIPTIVE STUDY Charlotte So; Mark H. Eckman. University of Cincinnati Medical Center, Cincinnati, OH. (Tracking ID #2194459)

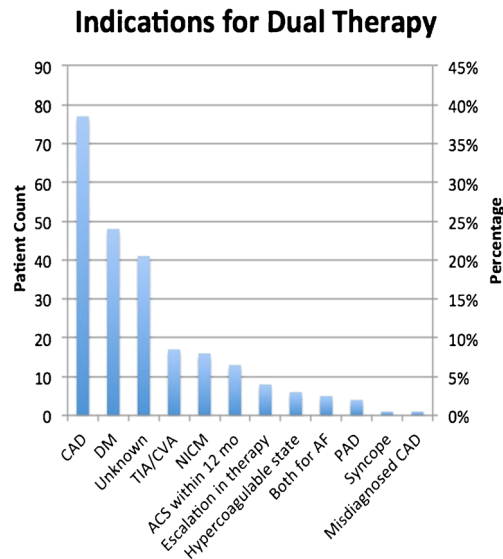
BACKGROUND: As part of a system-wide performance improvement initiative focused on improving antithrombotic therapy decisions for patients with atrial fibrillation (AF), we discovered a large number of patients who were receiving dual therapy with both aspirin and warfarin. Our goal was to determine the indications for dual therapy and possibly identify patients who might reasonably be treated with oral anticoagulant therapy alone. We hypothesized that the majority of these patients likely had a prior indication for antiplatelet therapy, such as stable coronary artery disease or diabetes, subsequently developed AF and had warfarin added to their regimen without discontinuing aspirin. There have been multiple studies examining outcomes of dual therapy in patients with indications for both antiplatelet and anticoagulant therapy. All have demonstrated an increased risk of major bleeding compared with either treatment alone; and among patients with stable CAD, in particular, dual therapy has not been shown to reduce ischemic events. The 2012 AF guidelines from the American College of Chest Physicians (ACCP) recommends against the use of dual therapy for AF patients with stable CAD, indicating that warfarin alone within a therapeutic INR range of 2–3 is sufficient.

METHODS: We identified 348 patients (23 % of the total AF cohort) in the UC Health Primary Care Network who were receiving dual therapy with an antiplatelet as well as antithrombotic agent as of 1/7/2014. We randomly sampled 200 charts to evaluate and categorize the indication(s) for dual antithrombotic therapy and collected information describing the time course of events that led to the initiation this treatment.

RESULTS: Of the 200 patients reviewed, 77 (38.5 %) had stable CAD and 48 (24 %) had DM as co-morbidities resulting in dual therapy. Forty-one patients (20.5 %) were classified as unknown, meaning patients whose charts had insufficient information to determine the reason for dual therapy. Thirty-six patients (18 %) had diagnoses of both CAD and DM and were counted in both categories. Thus the total added up to more than 100 %.

CONCLUSIONS: Our data show that the majority of patients receiving dual antithrombotic therapy had a diagnosis of stable CAD or DM. Of interest, in a significant proportion of patients aspirin had been initiated due to a prior diagnosis of either stable CAD or DM and was not discontinued when warfarin was started for their AF (73 and 14.58 % respectively). The 2012 ACCP guidelines indicate that there is insufficient evidence to warrant dual therapy in AF patients with stable CAD. A number of recent studies have examined outcomes in AF patients with stable CAD receiving dual therapy, and have concluded that dual therapy increased bleeding risk without reducing the risk of ischemic events, defined as stroke or myocardial infarction. Withdrawing aspirin

from the antithrombotic regimens of these patients may provide an opportunity to improve clinical outcomes.



COMMUNICATION ACCESS: WHY SOME PATIENTS CAN EMAIL THEIR DOCTORS AND OTHERS CAN'T Joy L. Lee¹; Mary Catherine Beach²; Albert W. Wu². ¹Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ²Johns Hopkins University, Baltimore, MD. (Tracking ID #2192490)

BACKGROUND: Primary care physicians have different modes to choose from in communicating with patients outside of the clinic. In particular, cellphone, email, and secure-messaging portals are now widely available. Yet use of these technologies are used unevenly across physicians and physicians may not grant the same access to all their patients. This work seeks to understand the disparity in use of communication modalities between physicians and the disparity in use by each physician within a patient panel.

METHODS: Semi-structured key informant interviews were conducted with 25 primary care physicians at a large academic medical center, practicing at several clinic settings. We recruited faculty participants from the Division of General Internal Medicine via email, and performed thematic analysis on the transcribed interview data.

RESULTS: Cellphone numbers were most privileged and often only given to patients who needed close monitoring; whether patients could “handle” access without abuse was often considered. A few respondents were adamant about never providing cellphone numbers to patients. While respondents acknowledged the deficiencies of email use, email access was more prevalent and accepted. Granting patients email access was characterized by circumstance (e.g. patients traveling abroad), status/familiarity (e.g. patients employed within the same hospital system), and patient initiative (e.g. patients who asked for email access). Respondents encouraged patients toward the secure-message feature of the newly electronic health record system and away from email. Challenges with communicating with patients with mental illness and setting boundaries for such patients were also raised. For example, one respondent noted “I had a patient with pathologies who would write paragraph after paragraph after paragraph in emails. So I actively do not give out my email.”

CONCLUSIONS: Primary care physicians do not use communication technologies interchangeably. Factors such as patient health, patient relationship with physicians, and patient demand are all considered as physicians grant differential patient access to cellphone and email within their panel.

COMMUNITY HEALTH WORKERS UNDERSTANDING OF AND ATTITUDES REGARDING INTIMATE PARTNER VIOLENCE IN THE DOMINICAN REPUBLIC Nisha Viswanathan¹; Leo Carretero¹; Omara Afzal¹; Janeen Marshall²; Taraneh Shirazian¹. ¹The Mount Sinai Hospital, New York, NY; ²Mount Sinai Hospital, New York, NY. (Tracking ID #2199090)

BACKGROUND: Intimate partner violence (IPV) is prevalent in Latin America and is a leading cause of death for women. A population survey of Latin American and Caribbean countries reveals that 17–53 % of women in the region have experienced physical or sexual violence by an intimate partner, and many women do not seek help or report abuse. Health care providers may not have the knowledge or education regarding IPV to be a

resource for affected women. Our objective is to explore the understanding and attitudes surrounding IPV among community health workers (cooperadoras) in the Dominican Republic, as well as determine the rates of the most common types of IPV in their respective communities.

METHODS: This project consisted of two components: focus groups and a survey component. Investigators planned to conduct five focus groups of cooperadoras representing various regions of the Dominican Republic. Participants were recruited randomly during a medical conference. A moderator script was developed using prior IPV-related research with community health workers. Participants were verbally consented for participation and to protect confidentiality, participants were asked to refrain from discussing responses outside of focus group. Nine open-ended questions were asked regarding domestic violence within their communities, including knowledge of and attitudes toward IPV in the community, understanding of causes and available resources, and the relationship between healthcare and affected women. Answers were audio recorded and transcribed. Data was analyzed using a grounded theory approach to coding, categorization and thematic generation/saturation. The cooperadoras were then trained to deliver existing validated surveys regarding types of IPV to women in their communities. Participants in the surveys were women in urban and rural communities and responses were anonymously recorded. Participants were recruited via door-to-door request creating a convenience sample of the community population. Results were analyzed as descriptive data to describe the prevalence of different types of IPV in various communities.

RESULTS: Five focus groups were conducted, for a total of thirty-five cooperadoras, representing 9 regions in the Dominican Republic and 110 distinct rural communities. Focus groups included both male and female adult participants (7 male and 28 female participants). Five common themes emerged from these focus groups. Cooperadoras 1. believed IPV is a social issue, not a medical one, 2. reported that women are at fault and felt that conflict between partners was due to poor communication, 3. stated that IPV is prevalent and that death was frequently an outcome, 4. felt they did not know the appropriate resources for affected women. 5. believed they did not know how to help affected women. Three hundred eighty-five IPV survey responses were collected. Analysis showed that urban and rural women were just as likely to suffer physical abuse (81 % urban and 85 % rural women), although urban women were more likely have suffered sexual abuse (81 % urban and 72 % rural; $p=0.04$). Rural women were more likely to experience coercive control (77 % urban and 88 % rural; $p=0.01$) versus urban women who were more likely to experience psychological abuse (88 % urban and 80 % rural; $p=0.03$).

CONCLUSIONS: Community health workers in the Dominican Republic could be a potential resource for women affected by IPV, but currently do not view themselves as such because of limited knowledge and resources. Limitations of the study include selection bias, and the possibility for recall and/or cultural biases. Strengths are that this study offers insights into the beliefs of cooperadoras in an area where little research has been done. This study also established the high prevalence of IPV in Dominican communities serviced by cooperadoras. By recognizing the different types of IPV present in these communities, future interventions include education for community health care workers to identify and advocate for women, appropriate referral of women to resources, and discussions with community members regarding management and prevention of intimate partner violence.

COMPARING HOSPITALIZATION CHARGES OF TEACHING VS NON-TEACHING HOSPITALS: ANALYSIS OF THE LEADING 30 DIAGNOSES OF ADMISSION Andrew Whipple¹; Mark Loehrke²; Christopher M. Begley¹; Akshay Amarani². ¹Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI; ²Western Michigan University School of Medicine, Kalamazoo, MI. (Tracking ID #2192576)

BACKGROUND: Teaching hospitals have classically been regarded as inefficient and financially burdensome, although to our knowledge no study has specifically addressed individual diagnoses in their assessment of hospitalization charges. Since teaching hospitals are reimbursed by the Inpatient Prospective Payment Services (IPPS) at a higher rate than non-teaching institutions, hospital-related expenses should more accurately be represented by hospital charges than cost. Hospitalization charges rely upon a variety of factors including admission diagnosis, extent of testing, length of stay, and treatment decisions. Therefore, this study aims to identify which admission related diagnoses are associated with differences between teaching versus non-teaching hospitalization charges.

METHODS: Using the Healthcare Cost and Utilization Project's online query system, summary data was collected regarding mean total hospitalization charges for teaching vs. non-teaching urban hospitals in 2012 through the Nationwide Inpatient Sample (NIS). The NIS contains data on 5,557,703 discharge events among 4324 U.S. hospitals in 44 states. Data was collected for discharges that had a non-neonatal, non-maternal primary admission diagnosis of one of the top 30 most common hospital admission diagnoses. For each of these diagnoses, a z-test was used to compare average hospitalization charges at urban

teaching hospitals and urban non-teachings hospitals. To control for multiple testing, a Bonferroni correction was applied and a significance level of $\alpha=0.05/30$ (0.0017) was used to determine statistical significance.

RESULTS: Of the 30 diagnoses tested, 12 resulted in statistical significance. Teaching hospitals, on average, had higher charges for: congestive heart failure (non-hypertensive) ($p<.0001$), mood disorders ($p<.0001$), cardiac dysrhythmias ($p<.0001$), complication of device/implant/graft ($p=.0010$), acute cerebrovascular disease ($p<.0001$), schizophrenia and other psychotic disorders ($p<.0001$), respiratory failure/insufficiency/arrest (adult) ($p=.0002$), and pancreatic disorders (not diabetes) ($p=.0007$). Non-teaching hospitals, on average, had higher charges for: skin and subcutaneous tissue infections ($p=.0010$), nonspecific chest pain ($p<.0001$), biliary tract disease ($p=.0009$), and asthma ($p<.0001$). Reliability and validity of these results are limited as the online query system provides only summary data which shows large differences between mean and median values and may indicate a skewing of the distribution of total charges.

CONCLUSIONS: There is statistically significant evidence that total charges differ for several of the most common diagnoses due to hospital teaching status. For 8 of the top 30 diagnoses, teaching hospitals had higher average charges while non-teaching hospitals had higher average charges on 4 of the top 30 diagnoses. There were no statistically significant differences in charges between teaching versus non-teaching hospitals for the remaining 18 diagnoses. This study is to serve as a pilot to open discussion regarding differences in charges due to teaching status. Subsequent analyses are needed to account for other various factors such as age, length of stay, gender, race, number of comorbidities, primary payer and primary procedure.

COMPARING USE OF LOW VALUE HEALTHCARE SERVICES AMONG U.S. ADVANCED PRACTICE CLINICIANS AND PHYSICIANS John N. Mafi¹; Christina C. Wee¹; Roger B. Davis¹; Bruce E. Landon^{2, 1}. ¹Beth Israel Deaconess Medical Center, Brookline, MA; ²Harvard Medical School, Boston, MA. (Tracking ID #2190292)

BACKGROUND: Evidence suggests that advanced practice clinicians (physician assistants and nurse practitioners, or APCs) provide similar quality of care when compared to physicians. Little is known, however, regarding differences in the use of potentially low value healthcare services.

METHODS: Using nationally representative data from the National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey we examined ambulatory visits for four common chief complaint categories: upper respiratory (e.g., sore throat, sinusitis), orthopedic (e.g., back pain, knee pain), neurologic (e.g., headache, vertigo), and skin conditions (e.g., rash, dermatitis) from 1997–2010. Outcomes included use of antibiotics (upper respiratory and skin complaints), CT/MRI (neurologic and orthopedic complaints), referrals to other physicians (all complaints), x-rays (upper respiratory and orthopedic complaints), and laboratory testing (all except orthopedic complaints). We used logistic regression models focusing on APC provider as the exposure of interest, adjusting for patient and physician characteristics and year, and weighted results to reflect national estimates. We also stratified our results based on acute vs. non-acute presentations and primary care provider (PCP) vs. non-PCP visits.

RESULTS: We identified 9940 APC visits and 101,063 physician visits with the study complaints, representing an estimated 2.2 billion U.S. ambulatory visits during the study period. Patients seen by APCs were typically younger (mean age 49.6 vs. 51.8 years, $p<.0001$), more frequently presented with acute symptoms (74.6 % vs. 70.4 % of visits, $p=0.005$), and were less commonly located in urban settings (76.1 % vs. 84.6 %, $p=0.005$) when compared to patients seen by physicians. APCs generally used more antibiotics than physicians for upper respiratory and dermatologic complaints (39.3 % vs. 33.3 % of visits, unadjusted $p=0.001$) and referred to other physicians more frequently than physicians (10.5 % vs. 7.8 %, $p=0.001$). Additionally, APCs ordered x-rays more often than physicians, particularly for orthopedic complaints (29.7 % vs. 23.8 %, $p=0.001$). CT/MRI and laboratory use were similar between provider groups. After multivariable adjustment results remained largely unchanged (Table). Stratification revealed that differences in utilization were especially apparent during acute presentations and visits with non-PCPs (e.g., subspecialists), where the adjusted proportions of antibiotic use during non-PCP visits were 29.5 % of APC visits vs. 22.8 % of physician visits, aOR 1.41 [CI 1.08, 1.84]; referrals to other physicians, 9.1 % of APC visits vs. 6.5 % of physician visits, aOR 1.43 [1.08, 1.89]; x-ray use, 23.7 % of APC visits vs. 19.8 % of physician visits, aOR 1.26 [1.01, 1.58]; and laboratory testing, 11.3 % of APC visits vs. 7.9 % of physician visits, aOR 1.48 [1.01, 2.15].

CONCLUSIONS: In this nationally representative analysis comparing APCs and physicians in the management of common ambulatory conditions, APCs generally used potentially low value healthcare services and referred patients to other providers more frequently than physicians. Differences in utilization primarily occurred during acute

presentations and were largely driven by subspecialists. As APCs continue to expand their role in ambulatory medicine these findings have important implications for containing costs and improving quality in the U.S. healthcare system.

Multivariable Adjusted* Frequencies of Use and Adjusted Odds Ratios of Use Comparing APC vs. Physician

	Adjusted Proportions of Use (%)	Adjusted Odds Ratio [95 % CI]	
	APC (n=9940)	Physician (n=101,063)	
Antibiotics	35.7	32.1	1.17 [1.01, 1.36]
Upper Respiratory	42.5	39.2	1.14 [0.97, 1.35]
Skin	10.0	8.1	1.25 [0.79, 2.01]
CT/MRI	7.2	7.6	0.94 [0.73, 1.20]
Orthopedic	7.2	7.4	0.98 [0.74, 1.28]
Neurologic	6.5	8.0	0.80 [0.50, 1.29]
Refer to Other Physician	8.8	7.2	1.26 [1.04, 1.52]
Upper Respiratory	6.4	4.5	1.46 [1.05, 2.04]
Orthopedic	10.0	8.4	1.22 [0.97, 1.53]
Neurologic	12.4	8.7	1.49 [1.05, 2.10]
Skin	5.8	5.3	1.10 [0.65, 1.86]
X-ray	18.0	15.3	1.21 [1.02, 1.45]
Upper Respiratory	7.4	6.4	1.18 [0.85, 1.64]
Orthopedic	28.2	22.8	1.33 [1.12, 1.59]
Lab Testing	12.7	10.9	1.19 [0.91, 1.55]
Upper Respiratory	11.8	9.6	1.26 [0.90, 1.76]
Neurologic	20.1	15.6	1.36 [0.88, 2.10]
Skin	4.2	7.0	0.58 [0.31, 1.08]

*Models adjusted for age, sex, race/ethnicity, modified Charlson disease count, symptom acuity, insurance, whether the clinician was the PCP, region, urban location, and year.

CONCEPTS UNDERLYING EFFECTIVE USE OF THE ARTS IN MEDICAL EDUCATION: A QUALITATIVE SYNTHESIS OF THE LITERATURE Paul Haidet¹; Jodi Jarecke¹; Nancy Adams¹; Michael Green¹; Heather Stuckey²; Daniel Shapiro¹; Daniel R. Wolpaw¹. ¹Penn State College of Medicine, Hershey, PA; ²Penn State University College of Medicine, Hershey, PA. (Tracking ID #2199128)

BACKGROUND: Despite widespread use of the arts in medical education as a tool to promote diverse skills related to patient-centered care, educators often lack guidance for incorporating arts into educational designs. The purpose of this study was to systematically review and synthesize the literature in order to: 1) identify how the arts promote learning; 2) identify strategies used by educators to facilitate arts-based learning; 3) create a conceptual model that guides implementation and evaluation of the arts in medical education.

METHODS: Our project team includes both clinicians and researchers with expertise in medical humanities, library sciences and education. We performed searches of the PubMed and ERIC databases using various combinations of terms related to teaching, the arts, humanism, and theoretical models. We included articles that described the use of the arts to promote skills or knowledge acquisition, or that introduced models or theoretical frameworks incorporating arts-based approaches to facilitate humanism or individual change. The PubMed searches yielded 825 articles, and ERIC searches yielded 179 articles. Upon review of the abstracts of all identified articles, 143 were selected for further review. We read the entire text of these 143 articles, and identified 46 that met our inclusion criteria. We performed a qualitative analysis of the text and data of these selected articles. We used Atlas.ti 7.1 software to categorize, code, and review key passages and qualitative data presented in the articles. Two of the investigators independently coded the article texts and data. Weekly phone calls were conducted to discuss emergent themes and coding practices. We constructed a conceptual model to guide usage of the arts in education through repeated iterations of review and discussion of coded passages.

RESULTS: We identified three areas of focus related to using the arts in teaching: a) unique qualities of the arts that promote learning, b) intermediate or process outcomes that result from arts-based teaching, and c) downstream impacts of arts-based teaching. Unique qualities of the arts included activating and cultivating imagination, engaging emotions, providing new ways of seeing and processing everyday phenomena, and experiencing facets of the human condition that students would not normally recognize. Intermediate and process-based outcomes included the breakdown of hierarchies and fostering community among diverse groups of learners, increased emotional awareness and intelligence, high degrees of engagement, and personal awareness and surfacing of assumptions.

Downstream impacts included increased empathy, narrative competence, better understanding of patients' perspectives, and enhanced communication skills. Our emerging conceptual model suggests that particular design choices and teaching behaviors, such as creating activities explicitly aimed at helping students translate lessons learned from the arts to medical practice, are critical for unlocking the unique qualities of the arts and achieving important process-based outcomes and downstream impacts.

CONCLUSIONS: The arts provide a unique and powerful tool for fostering medical trainees' knowledge, skills, and attitudes related to the human experience of illness. However, just incorporating the arts alone is unlikely to achieve such outcomes. Our conceptual model suggests that optimum incorporation of the arts in medical education requires an understanding of the aesthetic and observational processes inherent to the art being used, strategic use of the art to motivate engagement of students with the art and each other, and skillful translation of lessons learned from such engagement to students' practice of medicine.

CONCEPTUAL MODEL OF HOUSE STAFF WORKLOAD IN THE INPATIENT SETTING

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BACKGROUND: Workload is a complex concept that involves the cognitive, physical and emotional capacity to handle the tasks necessary to accomplish a goal. Medical education lacks a robust model for explaining the workload encountered by house staff. Our objective was to create a conceptual model of perceived contributors to house staff workload in the inpatient setting.

METHODS: We conducted focus groups with internal medicine interns and residents from a single program that includes 3 hospitals. The semi-structured focus group guide consisted of 19 open-ended questions with prompts. We audiotaped and transcribed the focus groups verbatim. We used the constant comparative method for data analysis. We started with open-coding to identify unique and unexpected codes. These were grouped into broader categories. We then applied a previously described model (the Systems Engineering Initiative for Patient Safety (SEIPS) model), for further categorization of the codes to one of the five SEIPS themes: Person, Environment, Technology, Organization, or Task. We used NVivo, a qualitative software package, for analysis. The line-by-line analysis was conducted by two members of the study team; one coded all of the transcripts; the other independently coded 2 of the transcripts. The entire study team met to discuss the emerging coding structure. Agreement between the two coders was calculated based on two of the transcripts.

RESULTS: We conducted five focus groups with a total of 19 internal medicine house staff. The coding scheme included 88 unique codes that encompassed traditional workload contributors (individual provider census) as well as more novel concepts (concern about physician physiologic needs—i.e., food). We sorted these codes into 18 categories, such as "Distractions," "Patient Factors," and "Electronic Health Record." All of the codes fit into the SEIPS model (Table), although some encompassed more than one SEIPS factor. Agreement between the two reviewers was 79 %.

CONCLUSIONS: The emerging conceptual model derived from these focus groups confirms that workload is a complex construct, composed of much more than census. The SEIPS model is a good starting point, but there are many nuanced contributors to workload within each of the SEIPS factors. Exploring this model in other residency programs is the next step in this work. Practically speaking, this detailed conceptual model may help to identify potentially important and modifiable contributors so that interventions to mitigate them can be developed and tested.

Contributors to House Staff Workload: SEIPS Factors and Corresponding Categories

SEIPS factor	Examples of Categories of Workload Contributors	Examples of Individual Codes within Each Category
Person	Ancillary Staff Attending Physician Medicine Team Patient Resident Characteristics	Knowledge of ancillary staff Supervision style Ability to work together Acuity; family characteristics Presence of physiologic needs
Environment	Distractions Location Resources Charting	Noise in team room Geographic localization of pts Wi-Fi Locating a computer

(continued)

Technology	Charting Health Record Resources	Mobile charting on rounds Accessibility of EHR from home Ability to use own devices (iPad)
Organization	Clinic Medicine Team Rounds Communication Discharge	Clinical responsibilities Team size Type of rounds (bedside v. table) Ability to give verbal orders Administrative help with process
Task	Charting Communication Coverage Discharge Education	Obtaining outside records Talking to ancillary staff Generating sign-out Making follow-up appointments Attendance at conferences

SEIPS is the Systems Engineering Initiative for Patient Safety

CONFIDENCE IN SMOKING CESSATION: SOCIAL SUPPORT TRUMPS HOUSEHOLD ENVIRONMENT

Cassia Wells²; Natalie Albanese²; Jesse Cohen²; Alice Tang²; Yixin Fang²; Ellie Grossman¹. ¹NYU School of Medicine, New York, NY; ²New York University, New York, NY. (Tracking ID #2198921)

BACKGROUND: Home environment and social support are important tools for behavior change. However, the relative influence of each in successful smoking cessation is unclear. Confidence in smoking cessation has also been shown to be strong predictor of successful quit attempts. In this study we examined the independent and combined effects of social support and home smoking environment on confidence in smoking cessation to help target future quit interventions.

METHODS: A secondary analysis was performed on a baseline survey of active smokers admitted to Bellevue Hospital Center and the Manhattan VA in New York City from 2011–2014 ($N=1619$). We examined the relationship of participants' home smoking environment and perceived social support to their confidence in quitting. Home smoking environment was defined as five categories: 1) participants who live alone; 2) participants who live with a non-smoker; 3) participants who live with a smoker who wants to quit; 4) participants who live with a smoker and do not know if they want to quit; 5) participants who live with a smoker who does not want to quit. Perceived social support for smoking cessation was a dichotomous variable (some support vs. no support). Confidence in smoking cessation was measured through a five-option ordinal scale, adapted from the California Tobacco Survey. The independent relationship between our predictors (home smoking environment and social support) and our outcome variable (confidence in quitting) were initially assessed in a univariate analysis. A multivariate linear regression was then performed using our two primary predictors, adjusting for age, gender, race, ethnicity, country of origin, education, recruitment site, and stable housing.

RESULTS: The majority of participants reported some social support for quitting (80 %) and only 22 % lived alone. Half of those who lived with someone lived with a smoker. Both increased social support ($p<0.0001$) and home quit environment ($p=0.037$) independently predicted increased confidence in smoking cessation. However, after a multivariate linear regression, only perceived social support remained significant ($p<0.0001$) whereas smoking environment did not ($p=0.91$). Other demographic variables significant in this model were race ($p=0.034$), recruitment site ($p=0.001$) and stable housing prior to admission ($p=0.001$).

CONCLUSIONS: Both social support and a positive home smoking environment increase smoking cessation confidence, however the effect of the home environment appears to be mediated through a sense social support. This also suggests that a significant amount of support may be coming from outside the home. Future interventions should focus on enhancing general social support and expand beyond the home.

Home Smoking Environment and Social Support vs. Confidence (Chi-square)

	Not at all confident	A little confident	Somewhat confident	Fairly confident	Very confident	P Value (χ^2)
Support						
Some support % (N=1307)	7.57 (99)	14.46(189)	26.40(345)	17.75(232)	33.82(442)	
No support % (N=322)	16.77(54)	19.57(63)	22.05(71)	16.46(53)	25.16(81)	
Home smoking environment						
Lives alone % (N=360)	12.22(44)	14.72(53)	26.94 (97)	13.89 (50)	32.22 (116)	
Lives with non-smoker % (N=636)	8.18 (52)	13.68(87)	24.37(155)	18.87(120)	34.91 (222)	
Lives with smoker who wants to quit % (N=213)	6.57(14)	15.96(34)	29.58(63)	15.96(34)	31.92(68)	
Lives with a smoker, don't know if want to quit % (N=165)	10.30 (17)	20.61(34)	21.21(35)	15.15(25)	32.73(54)	
Lives with smoker does not want to quit % (N=254)	9.06 (23)	16.54(42)	26.38(67)	22.83 (58)	25.20(64)	

Multivariate Linear Regression with Confidence as Dependent Variable

	Estimate	SE	P - Value
Intercept	2.7269	0.2151	<.0001
Some Support (vs. No support)	0.3732	0.0906	<.0001
Living with a nonsmoker (vs. Alone)	0.0847	0.0959	0.377
Living with a smoker, don't know if they want to quit (vs. Alone)	0.0528	0.1384	0.7027
Living with a smoker, who does not want to quit (vs. Alone)	0.0619	0.1192	0.6037
Living with a smoker who wants to quit (vs. Alone)	0.1003	0.1229	0.4143
White (vs. Other)	-0.1889	0.1068	0.0769
Black (vs. Other)	0.0211	0.1072	0.8438
Hispanic (vs. Non-Hispanic)	0.0371	0.0897	0.6796
Male (vs. Female)	-0.0054	0.0466	0.9078
VA (vs. Bellevue)	-0.2902	0.0878	0.0009
Stable housing (vs. Unstable housing)	0.2671	0.0829	0.0013
US born (vs. Foreign born)	-0.0302	0.0474	0.5241
Finished high school (vs. Did not graduate high school)	0.0942	0.1022	0.3568
Some college (vs. Did not graduate high school)	0.0351	0.0947	0.711
Age	0.0062	0.0029	0.0354

CONSISTENCY OF RESPONSE IN THE COMPASS STUDY [BREATH POWERED™ NASAL DELIVERY OF 22 MG SUMATRIPTAN POWDER (AVP-825) VERSUS 100 MG ORAL SUMATRIPTAN IN ACUTE MIGRAINE: A COMPARATIVE CLINICAL TRIAL] Richard B. Lipton²; Dawn C. Buse²; Ken Shulman¹; Joao Siffert¹; Scott Siegert¹. ¹Avanir Pharmaceuticals, Inc., Aliso Viejo, CA; ²Albert Einstein College of Medicine and Montefiore Medical Center, Bronx, NY. (Tracking ID #2188702)

BACKGROUND: AVP-825 is an investigational Breath Powered™ Bi-Directional™ product containing low-dose sumatriptan powder (22 mg) that delivers drug to the upper posterior segments of the nasal cavity, enabling rapid systemic absorption. Compared with 100 mg oral sumatriptan, AVP-825 showed significantly greater benefits on the COMPASS primary endpoint, the SPID-30 (results presented previously). In a real-life clinical setting, the consistency of a treatment effect across multiple migraines is a priority among patients. Measures of consistency have been reported for many migraine therapies, though the specific design and analyses used have varied. The purpose of this report is to evaluate consistency of pain response at early timepoints across multiple migraine attacks for AVP-825 vs. sumatriptan 100 mg oral tablets in the COMPASS study.

METHODS: Multicenter, double-dummy, crossover study with two 12-week treatment periods. Patients received AVP-825 or oral sumatriptan 100 mg tablets plus complementary placebos in period 1 then switched treatment for period 2. Patients treated ≤ 5 qualifying migraines/period within 1 h of headache onset, even if pain was mild. Multi-attack pain relief and pain freedom rates were estimated for the first 2 attacks, ≥ 2 of the first 3 attacks, and 3 of the first 3 attacks in each period. Comparisons assessed using McNemar's test.

RESULTS: A total of 185 patients were treated in both periods (full analysis set; 1531 migraine attacks treated). For patients treating ≥ 2 attacks in each period ($n=165$ patients each group), AVP-825 was superior to 100 mg oral sumatriptan in rate of pain relief (37.6 % vs. 18.8 %, $p<.0001$) and pain freedom (10.9 % vs. 3.0 %, $P=.0072$) at 30-min post-dose for the first two attacks. For patients treating ≥ 3 attacks in each period ($n=140$ patients each group), AVP-825 was superior to oral sumatriptan at 30 min post-dose for

pain relief (51.4 % vs. 33.6 %, $P=.0002$) and pain freedom (15.7 % vs. 6.4 %, $P=.015$) in ≥ 2 of the first 3 migraine attacks treated, and for pain relief (27.1 % vs. 12.1 %, $P=.0002$) at 30 min post-dose in 3 of the first 3 migraine attacks treated.

CONCLUSIONS: Compared with 100 mg oral sumatriptan, AVP-825 (22 mg sumatriptan nasal powder) resulted in more consistent pain freedom and pain relief across multiple migraine attacks within 30 min of treatment. Consistent rapid relief suggests the pharmacokinetic advantage of Breath Powered delivery of sumatriptan powder.

CONTRIBUTION OF PATIENTS' CLINICAL AND SOCIAL CHARACTERISTICS TO DIFFERENCES IN HOSPITAL READMISSION RATES Michael Barnett^{1, 2}; John Hsu^{3, 2}; J. Michael McWilliams^{2, 1}. ¹Brigham and Women's Hospital, Brookline, MA; ²Harvard Medical School, Boston, MA; ³Massachusetts General Hospital, Boston, MA. (Tracking ID #2193546)

BACKGROUND: To reduce hospital readmissions, Medicare penalizes hospitals with higher than expected 30-day readmission rates by up to 3 % of inpatient payments through the Hospital Readmission Reduction Program, implemented in 2012. The program determines a hospital's adjusted readmission rate using a statistical model that accounts only for patients' age and inpatient diagnoses in the prior 12 months. The extent to which adjustment for a comprehensive set of patients' clinical and social characteristics accounts for differences in hospital readmission rates has not been described.

METHODS: We analyzed survey data from the nationally representative Health and Retirement Study (HRS) and linked Medicare claims. Our study sample included respondents to biennial HRS surveys from 2000–2010 who had at least 1 admission during the survey year or 2 subsequent years after survey completion. We assessed a range of patient factors as potentially predictive of readmission when added to the standard model used to generate publicly reported hospital-wide readmission rates (HWRRs). Specifically, we estimated logistic regression models predicting 30-day readmission as a function of patient factors included in the HWRR model (age and 31 condition indicators constructed from the preceding 12 months of inpatient claims). We then added patient characteristics from 3 additional categories: 1) eligibility and demographic information from Medicare enrollment files (sex, Medicaid status, disability and end-stage renal disease); 2) diagnoses from all claims, including the hierarchical condition category (HCC) score from claims in the preceding calendar year, and 26 Chronic Condition Warehouse (CCW) indicators describing a patient's total chronic disease burden; and 3) 27 social and health variables from HRS survey items, including race, education, finances, health behaviors, functional status, family structure, and social supports. We assessed whether these variables were predictive of readmission when added to predictors from the HWRR model. We then compared differences in readmission rates between patients admitted to high vs. low performing hospitals, before vs. after adjusting for each category of characteristics in succession. Specifically, we categorized hospitals into quartiles according to their publicly reported HWRR in 2011–2012 and compared readmission rates between patients admitted to hospitals in the highest vs. lowest quartiles. To better match the study period with the publicly reported HWRR period, we limited this analysis to discharges from 2008–2012. We used design-based variance estimators to account for clustering within geographic areas, hospitals, and patients.

RESULTS: The full study sample included 9055 patients with 32,610 discharges from 2000–2012. In univariate analyses, 26 of 31 additional variables from claims and enrollment files and 25 of 27 HRS survey variables significantly predicted readmission. When added individually to a model including all predictors from the HWRR model, most of these additional variables remained significantly predictive of readmission. Restricting the analysis to 2008–2012

left 11,419 discharges among 4481 patients for comparing readmission rates by publicly reported HWRR. There were significant differences between patients discharged from hospitals in the highest vs. lowest HWRR quartile across most additional variables, including HCC score (2.47 vs. 2.24 for highest vs. lowest), CCW condition count (11.1 vs. 10.5), race (27.6 vs. 9.6 % black), education (34.7 vs. 25.0 % without high school degree), percent needing assistance with an activity of daily living (45.5 vs. 36.9 %), and total assets (36.8 vs. 26.4 % in lowest quartile of assets; $p < 0.001$ for all). Patients discharged from hospitals in the highest quartile of publicly reported HWRRs were significantly more likely than those discharged from hospitals in the lowest quartile to be readmitted within 30 days (unadjusted odds ratio (OR)=1.28; $p=0.001$). As expected, adjusting for HWRR model predictors minimally changed this estimate (OR=1.26; $p=0.002$), because publicly reported HWRRs already account for these factors. Adjusting for all additional patient characteristics from claims and HRS surveys reduced this OR by 38 % to 1.16 ($p=0.08$), with both claims-based diagnosis and HRS survey variables contributing independently to this reduction.

CONCLUSIONS: Much of the difference in risk of readmission between patients discharged from hospitals with higher versus lower publicly reported readmission rates was explained by differences in patients' clinical and social characteristics that are not considered in current risk adjustment of hospital readmission rates. This implies that current policy penalizes hospitals in large part for serving sicker and more socially disadvantaged patients. To avoid potentially unintended consequences of these penalties, such as exacerbating disparities, more robust adjustment for patient factors or alternative payment models may be required.

COORDINATED PERFORMANCE MEASUREMENT AND IMPROVEMENT EFFORTS IN CALIFORNIA'S SAFETY NET SYSTEMS: EARLY EXPERIENCE AND LESSONS: PUBLIC HEALTHCARE SYSTEMS EVIDENCE NETWORK AND INNOVATION EXCHANGE (PHOENIX) Courtney R. Lyles²; David Lown⁴; Gato I. Gourley²; Sara Ackerman¹; Dean Schillinger^{2, 3}; Margaret A. Handley²; Urmimala Sarkar^{3, 2}. ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³University of California, San Francisco, San Francisco, CA; ⁴CAPH/SNI, Oakland, CA. (Tracking ID #2198232)

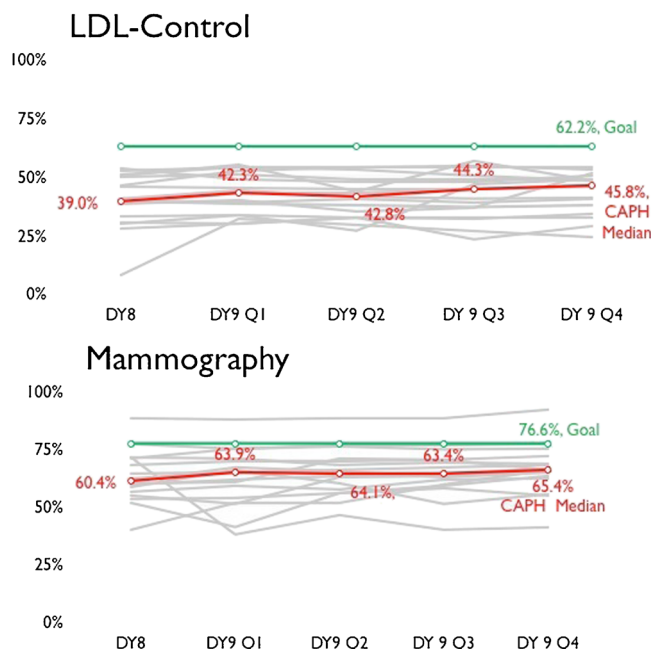
BACKGROUND: Safety-net health systems serving predominantly Medicaid and uninsured populations often lack incentives and resources to support performance measurement and improvement activities. However, the California Delivery System Reform Incentive Program (DSRIP) is the first of its kind pay-for-performance Medicaid waiver that incentivizes the state's public health care systems to improve quality of care in both inpatient and outpatient settings. To enhance DSRIP participants' capacity to engage in (1) best practices to improve quality of care and (2) reporting of DSRIP-required metrics, the California Association of Public Hospitals and UCSF established the Public Healthcare Systems Evidence Network and Innovation eXchange (PHoENIX). Some of the first PHoENIX priorities were to work together to meet high population-based targets for two metrics in particular: mammography screening (76.6 %) and LDL control (<100 mg/dL) for diabetes (62.2 %).

METHODS: All 17 public hospital systems across the state engaged in the DSRIP program. We used both qualitative and quantitative methods to monitor the performance measurement activities and outcomes over a 1-year period, guided by the Consolidated Framework for Implementation Research. We conducted 21 in-depth interviews and 6 focus groups ($n=40$) with hospital leaders, as well as attended 4 in-person or web convenings about performance improvement activities. During these sessions, we characterized improvement efforts and identified barriers and enablers for meeting the performance metrics. In addition, we assessed participation in each performance improvement activity and reviewed quarterly outcome reports. We evaluated total 1-year improvements for the mammography and cholesterol metrics, classifying systems who improved by 2 %, 5 %, or had no change (± 2 %) over time.

RESULTS: Participation in improvement was high across the public hospital systems, as every system engaged in at least one performance activity. Similarly, each of the 4 convenings included representatives from at least 75 % of systems and 40–55 participants in total. However, our qualitative work uncovered a wide range of success across systems. The most common perceived barriers to change reported included: lack of personnel for data reporting/management; structural barriers, such as fragmented electronic health records, lack of equipment (e.g., mammogram machines); competing priorities, such as providing access to care for the newly insured; and a change in the national guideline for cholesterol control. Enablers included strong leadership, use of registry/panel management systems, and integrated data/information technology systems. To date, 59 % ($n=10$) of the health systems reported improvements their performance on mammography by 2 percentage points or more, 53 % ($n=9$) by 5 percentage points or more, and 1 system (6 %) had no change.

For LDL, 41 % ($n=7$) reported improvements in LDL by 2 % or more, 35 % ($n=6$) improved by 5 percentage points or more, and 24 % ($n=4$) had no change. However, only 1 system met the ultimate mammography target and no systems met the LDL target in this first year.

CONCLUSIONS: This project was one of the first collective efforts among safety net hospitals to work systematically and collectively on performance measurement and improvement. While our findings are early, they suggest that public health systems can engage in this area, but likely need more structural support to have sufficient staffing and information technology systems to reach these goals. Implementation science methods helped to identify barriers and enablers of change which can be applied to real-world improvement efforts, especially as we leverage PHoENIX in future quality improvement efforts.



Total improvements on Mammography and LDL metrics

COST-CONSCIOUS CARE IN THE UNCONSCIOUS: THE FINANCIAL IMPLICATIONS OF DIAGNOSTIC NEUROLOGIC TESTING IN PATIENTS PRESENTING WITH SYNCOPES Connor Healey¹; Jonah Feldman^{1, 2}; Thomas Coppola¹; Brahmabhatt Saloni¹. ¹Winthrop University Hospital, Mineola, NY; ²Stony Brook School of Medicine, Stony Brook, NY. (Tracking ID #2199332)

BACKGROUND: The presenting complaint of syncope represents a substantial burden on healthcare resources. Diagnostic neurologic testing is frequently ordered by clinicians in the evaluation of these patients, despite the paucity of evidence substantiating their utility. We aim to quantify the frequency and cost of neurologic testing of patients who present with syncope without a neurologic deficit, a practice that is not supported by major society guidelines.

METHODS: The medical records of 500 randomly selected patients admitted to a single community-based, university hospital during the 2012 calendar year with a diagnosis of Syncope and Collapse (ICD code 780.2) were analyzed. Exclusion criteria include transfer from another facility, elective admission, presyncope, mechanical fall without loss of consciousness, and syncope following admission to the hospital. The admission documentation was reviewed for evidence of a neurologic finding (ie. focal neurologic deficit or seizure activity) by history or exam to warrant further diagnostic testing. Subsequent testing with Carotid Ultrasound, Head CT, Brain MRI and EEG were noted. Costs of these investigations were determined using the 2012 billing information for the facility, adjusted for the cost-to-charge ratio.

RESULTS: Only 237 of the 500 patients did not meet exclusion criteria, with presyncope being the most common reason for exclusion. Among the 237 patients head CT was the most frequently performed neurologic test ($n=191$, 81 %), followed by Carotid US ($n=105$, 44 %), EEG ($n=69$, 29 %) and Brain MRI ($n=57$, 24 %). The proportion of tests that were deemed appropriate because they corresponded to a neurologic finding was low, and exhibited an inverse trend with the most utilized tests being the least likely to be associated with an appropriate indication. Evidence of a neurologic indication was found for ordering a CT head in only 15 % of patients (25/191), Carotid US 16 % (17/105), EEG 20 % (14/

69), and Brain MRI 30 % (17/57). The direct costs of the unwarranted tests amongst the 237 patients were \$113,886 for Head CT, \$28,072 for Carotid US, \$13,475 for EEG, and \$54,680 for Brain MR.

CONCLUSIONS: Neurologic testing in patients admitted to the hospital with syncope, but without a neurologic finding inflicts a substantial cost and represents an area of considerable waist for the healthcare system. Additional research is needed to identify reliable ways to change provider practice patterns in order to address this important problem.

CROSS-CULTURAL INTER-PROFESSIONAL FACULTY DEVELOPMENT IN JAPAN: RESULTS OF AN INTEGRATED WORKSHOP FOR CLINICAL TEACHERS Jeffrey G. Wong¹; Daisuke Son²; Wakako Miura². ¹Medical University of South Carolina, Charleston, SC; ²University of Tokyo School of Medicine, Tokyo, Japan. (Tracking ID #2198627)

BACKGROUND: Faculty development programs have proven useful for improving the clinical teaching skills of clinicians within medicine. One particular faculty development program, created at the Stanford Faculty Development Center (SFDC), has been successfully implemented in some foreign cultures, but has not been studied in Japan. Furthermore, joint inter-professional faculty development activities are less commonly reported and are infrequently studied. We wondered whether the SFDC faculty development program could be used to improve the clinical teaching of Japanese physician and nurse educators in a joint faculty development workshop series.

METHODS: A series of 7 small group interactive workshops, based on the SFDC model, were presented to 19 educators at the University of Tokyo-School of Medicine. Each seminar was 120 min long and was presented in English by one author (JGW) who is a trained SFDC facilitator. The seminars consisted of a mini-lecture introducing the educational topic, video-taped reviews of actual clinical teaching scenarios, interactive role-playing performed by the workshop participants, and the formulation of personal learning

goals by each participant. The written seminar materials were translated into Japanese and the video-tape scenarios were over-dubbed into Japanese by two of the authors (DS and WM). The role plays were also performed in Japanese and the commentary was translated into English as necessary by one of the authors (DS). There were three main outcome measures: 1) the seminar participants' satisfaction with the workshops; 2) their self-reported teaching abilities assessed through the use of a well-studied retrospective pre- post-questionnaire administered at 2 different times (1 month and at 12 months after the workshops); and 3) whether or not the participants were successful in completing "commitment to change (CTC)" statements at 1 year's time. Statistically, the numerical mean scores from each of the two sections of the questionnaire ("Global Assessment" and "Specific Teaching Behaviors") were compared using the two-tailed student *t*-test and standard deviation of mean scores were calculated. The actual percentage of successfully incorporated CTC statements was also reported.

RESULTS: There were 12 physicians, 6 nurses and 1 English-language teacher who participated (10 men and 9 women - 2 physicians, all of the nurses and the English teacher were women). All participants valued the seminars and the inter-professional aspects of the sessions. Summative mean self-reported ratings of Global Assessment improved between retrospective pre- and post- test scores at 1 month and at 12 months (**pre**=27.3, **post(1)**=36.8, $p<0.001$, **post(12)**=34.9, $p<0.001$) and for specific teaching behaviors (**pre**=82.1, **post(1)**=111.1, $p<0.001$, **post(12)**=104.3, $p<0.001$). There was non-significant degradation of improvement between the 1 month and 12 month values. In total, 24/39 CTC statements were successfully achieved at 1 year (61.5 %).

CONCLUSIONS: While limited to a single institution of clinical educators, we were able to demonstrate self-reported improvement in clinical teaching skills for both medicine and nursing faculty teachers that endured at least 1 year after the educational intervention. Inter-professional faculty development across both cultures and health profession disciplines can be achieved.

Self-Reported Teaching Skills Scores

Gender	Occup	Years Teaching	Global Teaching Performance Maximum Score=55				Specific Teaching Behaviors Maximum Score=145			
			Retro Pre	Retro Post	1-year post		Retro Pre	Retro Post	1-year post	
M	Phys	7	43	43	43		112	116	123	
M	Phys	30	36	44.5			79	109		
M	Phys	17	36	43	38		99	119	110	
M	Phys	6	28	39	30		74	104	100	
M	Phys	10	38	47	38		99	116	115	
M	Phys	5	21	31	21		84	118		
M	Phys	9	37	46	45		93	106	107	
M	Phys	9	36	47	41		99	126	110	
F	Phys	4	16	27	27		68	145	90	
F	Phys	3	24	35	26		63	104	102	
M	Phys	1	26	28	38		93	109	92	
F	Phys	3	13	31	31		55	105	96	
M	Phys	2	23	36	44		73	113	103	
F	Nurse	9	27	36	36		88	119	101	
F	Nurse	1	29	38	37		83	94	91	
F	Nurse	4	22	37	41		60	111	125	
F	Nurse	4	24	34	36		80	106	112	
F	Nurse	1	13	19	23		64	71	74	
F	Eng T	15	26	38	29		94	120	113	
	Average	7	27.26	36.82	34.67		82.11	111.11	103.67	
	p <		0.001	0.001	0.248	p <	0.001	0.001	0.073	
	S.D.		8.61	7.48	7.32	S.D.	15.71	14.48	12.87	

CROWDSOURCING THE DIAGNOSIS: RESULTS OF A NATIONAL SURVEY OF PATIENT ATTITUDES TOWARDS PHYSICIANS SHARING DEIDENTIFIED PATIENT IMAGES ONLINE

James Colbert^{2, 5}; Eliyahu Lehmann⁶; Priyanka Agarwal³; Joy L. Lee¹; Katherine C. Chretien⁴; Lisa S. Lehmann⁵. ¹Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ²Newton-Wellesley Hospital, Newton, MA; ³University of California, San Francisco, San Francisco, CA; ⁴Washington DC VAMC, Washington, DC; ⁵Brigham and Women's Hospital, Boston, MA; ⁶Cornell University, Ithaca, NY. (Tracking ID #2196426)

BACKGROUND: Physicians have traditionally used case conferences, scientific meetings, and medical journals as opportunities to improve their own knowledge and advance

medical research. The Internet and social media now offer new opportunities for physicians to share information with each other and to learn through virtual interactions. For example, smartphone apps now enable physicians to easily upload and share deidentified patient images with health care professionals around the world. While such smartphone apps have the potential to foster medical education, improve patient care and advance medical knowledge, little is known about patient preferences towards physicians sharing deidentified patient information via online forums.

METHODS: We conducted a paper-based cross-sectional survey of patients at four academic primary care centers in Boston, Washington DC, and San Francisco. The survey was conducted in English, and patients were asked about their usage of technology and social media for healthcare. As part of the survey, participants were presented with the

following scenario: Let's say you have a worrisome rash on your back and your doctor would like to post a picture of just your back (no one could tell it was you) on a public website that's mainly viewed by physicians and scientists. Participants were asked if they would give permission to have their picture posted online for the following reasons: 1) to improve their own medical care, 2) to educate other doctors, and 3) to advance scientific knowledge. Respondents were also asked whether they would prefer their doctor to obtain written consent, verbal consent or no formal consent prior to posting the picture online. Data were also collected on patient demographics, including age, gender, education, race, ethnicity, and health status.

RESULTS: A total of 491 patients completed the survey. Fifty-nine percent (289) of respondents were women, 41 % (199) were white, 32 % (156) were black, and 10 % (50) were Hispanic. Forty-one percent were younger than age 50 and 27 % were age 65 or older; 56 % (273) had at least a college degree; and 33 % (164) rated their health as excellent or very good. Overall, a majority of surveyed patients would give permission to their primary care provider to post a deidentified image of their rash online to improve their care, educate other doctors or advance medical knowledge (80 %, 82 %, 82 % respectively). The remaining 20 % of surveyed patients would never allow the image to be posted. Among the respondents who were willing to have their physician post their picture online if it would improve their doctor's ability to identify and treat the rash, 31 % felt that no formal consent was required, 43 % felt that verbal consent should be obtained, and 26 % felt that written consent was needed. Responses were similar when patients were asked what type of consent should be obtained for their doctors to use their image online to advance medical education or research (see Table). Multivariate regression analysis showed that white respondents were three times more likely than other races to give permission to post a picture (OR 3.17, $p=0.03$). Patients who report posting about their own health on social media were more than twice as likely to give permission to their doctor to post (OR=2.5, $p=0.03$). Further analysis found that patients aged 65 or older were more likely to indicate that no permission is necessary for their physician to post a picture online when compared with younger patients (OR 4.5, $p<0.01$). However, younger patients (age 18–34) were significantly more likely than older patients to believe that verbal consent was sufficient rather than written consent (OR 3.7, $p<0.01$). Education, self-reported health status, and age had no significant impact on whether a patient would give permission to post their picture on social media.

CONCLUSIONS: Most respondents would allow physicians to post a deidentified image of them online if doing so could help improve their medical care, contribute to medical education or advance medical research. Among those who would allow their physicians to post their picture online, nearly half felt that verbal consent should be obtained prior to posting the picture. Smaller numbers felt that written consent or no consent would be most appropriate. These data suggest that while patients in general are supportive of physicians sharing medical images online, hospitals and medical clinics will need to carefully consider how best to implement patient consent policies that protect patient privacy without restricting the ability of physicians to benefit from online sharing of information. Patient attitudes towards a physician posting a deidentified image of them online

CURBING ANTIMICROBIAL RESISTANCE: DO PHYSICIANS RECEIVE ADEQUATE TRAINING ABOUT ANTIBIOGRAMS? <!--ENDFRAGMENT--> Priya Nand; Stuart Cohen; Machelle D. Wilson; Jennifer Brown. University of California, Davis, Sacramento, CA. (Tracking ID #2199142)

BACKGROUND: Antibiotics are among the most common classes of medications prescribed in health care settings. The U.S. Centers for Disease Control and Prevention (CDC) estimates that up to 50 % of antimicrobial use in health care settings is inappropriate or unnecessary. Antibiotic overuse and misuse is fueling an alarming upsurge in the rates of antimicrobial resistance and deaths attributable to antibiotic-resistant organisms. As part of the national strategy for combating this public health crisis, the CDC recommends the use of local antibiograms to guide judicious prescribing practices. We aimed to assess whether physicians are receiving adequate training about antibiograms. <!--EndFragment-->

METHODS: From April 2014 to October 2014, a 20-item, internet-based survey was sent to house staff physicians in Internal Medicine training programs throughout the U.S. Questions focused on antibiogram knowledge, interpretive skills, and training practices. <!--EndFragment-->

RESULTS: Overall, 266/1293 (21 %) invited house staff responded; 178 (67 %) were residents and 87 (33 %) were interns. Eighty-seven percent of respondents were from academic institutions and the remainder were from community-based programs. For respondents who completed the antibiogram interpretation questions, the mean correct score was higher for residents ($n=164$) than for interns ($n=72$) (85 % vs 74 %, $P=0.011$). The mean score was also higher for respondents who had completed an infectious diseases (ID) rotation ($n=164$) as compared to those who had not ($n=72$) (85 % vs 75 %, $P=0.018$). Almost 83 % of respondents felt confident in their ability to interpret antibiograms

however, 30 % had never received any formal antibiogram training or were self-taught. Only 89/140 (64 %) respondents who completed an ID rotation were taught about antibiograms during the rotation. About one-fifth of respondents did not know how to obtain their institution's antibiogram. Overall, 71 % of respondents wanted to receive more training in antibiograms; of these, most (91 %) preferred training during internship or residency lectures. <!--EndFragment-->

CONCLUSIONS: Physicians are not receiving adequate training about antibiograms. We encourage medical training programs to evaluate their curricula and to optimize house staff education regarding antibiograms. A multi-faceted approach, including didactic lectures and the practical application of antibiograms during clinical rounds, should be considered. Improving house staff training about antibiograms and the judicious use of antimicrobials is essential to curb the growing crisis of antimicrobial resistance. <!--EndFragment-->

DECLINING PASS RATES OF THE AMERICAN BOARD OF INTERNAL MEDICINE CERTIFICATION EXAMINATION: PROGRAM DIRECTORS' PERSPECTIVES Lisa L. Willet⁶; Andrew J. Halvorsen⁴; Michael Adams³; Vineet M. Arora⁷; Karen Chacko⁵; Furman S. McDonald⁴; Amy Oxentenko⁴; Sara L. Swenson¹; Aimee K. Zaas²; Saima Chaudhry⁸. ¹California Pacific Medical Center, San Francisco, CA; ²Duke University, Durham, NC; ³Georgetown University Hospital, Washington, DC; ⁴Mayo Clinic, Rochester, MN; ⁵University of Colorado Denver, Aurora, CO; ⁶University of Alabama at Birmingham, Birmingham, AL; ⁷University of Chicago, Chicago IL, IL; ⁸nslij, Manhasset, NY. (Tracking ID #2200724)

BACKGROUND: The American Board of Internal Medicine (ABIM) is a high stakes exam. Since 2007, the percentage of first time test takers who passed the ABIM has fallen. To understand reasons for the decline, we administered a national survey to Internal Medicine (IM) PDs to determine their views on why the pass rates have fallen.

METHODS: The Association of Program Directors in Internal Medicine (APDIM) Survey Committee develops yearly questionnaires to address current issues facing IM residency programs. With the 2013 Web-based electronic survey, we assess PD perspective of the ABIM declining pass rates. We assessed differences in pass rates by program demographics (program description, region, size, PD tenure), and resident demographics (percentage of US medical graduates, women, and underrepresented minorities [URM]). We assessed PD agreement with: reasons for ABIM pass rate decline; why residents did not pass; methods to prepare residents; and use of InTraining Examination (ITE). We asked PDs to free text reasons why the pass rate declined, if given statements did not capture their thoughts. These responses were coded for qualitative data.

RESULTS: Our response rate was 67.8 % (265/391). We found no difference in ABIM pass rate by program type (79.5 % average pass rate). There were differences by region, program size, and PD tenure. Regionally, the pass rate was 71.8 % for Continental US and Unincorporated Territories ($p=0.001$); when only Continental US was included, regional differences were no longer significant ($p=0.27$). Smaller size residency programs had lower pass rates: <40 residents 82.5 %, 40–73 residents 85.3 %, >73 residents 86.8 % pass rate ($p=0.004$). PDs with shorter tenure had lower pass rates: tenure <2 years 83.2 %; 2–7 years 84.2 %; >7 years 87.4 % ($p=0.003$). Of resident demographics (% of US medical graduates [USMG], women, and URM), the only differences were found in programs with lower percentage of USMGs. Pass rates for programs with <12 % USMGs were 85.3 %, and >80 % USMGs 88.6 % ($p<0.001$). **Reasons for pass rate decline:** Most PDs feel pass rate decline is most attributable to residents spending less time independently reading (73 % agree/strongly disagree) and reflecting about their patients (67 % agree/strongly agree). Fifty-one PDs used the free text box, citing 42 additional reasons, of which the most common were: less qualified trainees taking the ABIM, societal factors/generational differences in learning and studying, and logistics of the clinical environment. **Reasons specific residents did not pass the exam:** PDs communicated with all (18 %) or some (49 %) of the residents who failed the exam. Top reasons why residents felt they failed were: resident was "poor standardized test taker" (67.9 %), didn't study enough (65.4 %), and had competing personal responsibilities (pregnancy, children)(48.4 %). The top three reasons PDs felt the resident(s) did not pass were low performance on the ITE each post graduate year (PGY)-3, 72.5 %; PGY2 68.7 %; PGY1 55.5 %. **Methods to prepare residents for ABIM exam:** The majority of programs provide a board review program (86 %), for a mean of 57.9 h/year, including: Medical Knowledge Self-Assessment Program (MKSAP) (96.2 %), MKSAP incorporated into other regular teaching sessions (62.9 %), and independent designated lectures (58.1 %). These sessions target PGY-3s (98.1 %), PGY2s (69.0 %) and PGY1s (42.4 %). Programs provide funding for MKSAP (61.1 %), for independent study materials (49.8 %) and commercial board review course registration (26 %). **Use of In Training Examination (ITE):** Programs administer the ITE to all PGY levels (PGY2 93.6 %, PGY3 91.7 %, and PGY1 86.4 %). Ninety-one percent of PDs use a threshold score on the ITE to identify a resident at risk for failing the ABIM; 77 % have not changed the threshold in the past 3 years. The majority of PDs use the national percentile rank (86 %) to identify an at-risk resident, versus total percent of

questions correct (14 %). The mean percentile rank score used by PDs is 32.6. Most (69.8 %) use the same threshold score regardless of PGY. **Program response to ABIM failures:** Seventy percent of PDs have made changes to their board preparation methods because of ABIM failures. Those who have made changes are more likely to have lower pass rates (83.7 % pass rate) compared to PDs that have not made changes (92.7 % pass rate) ($p < 0.0001$). Sixty-seven percent of PDs give stronger consideration to US Medical Licensing Examination scores for ranking medical students than in years' past.

CONCLUSIONS: The ABIM is important for our profession, and the declining pass rates warrant study. We identified characteristics of programs with lower pass rates and IM PD perspectives on reasons for the decline. The level of detail we discovered will inform the IM community of key areas for further study to help our trainees succeed in certification.

DECREASING THE FRICTION BETWEEN TEAMS: PERSPECTIVES OF MEDICINE RESIDENTS AND SUBSPECIALTY CONSULTANTS ON THE CONSULTATION PROCESS. Amar Kohli; Michael Elnicki. University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2193176)

BACKGROUND: Consulting a colleague is an integral task for medicine residents. Although long known to be suboptimal, the process continues to be characterized by a lack of didactic teaching in doctor-to-doctor communication. Physicians are still not "inherently" able to communicate consultation needs effectively with other physicians, and this inability can lead to dissension or frank hostility among colleagues. Earlier studies indicate that the paramount elements to a consult call are patient identifier, consult urgency and consult question. These criteria were recapitulated several times as physicians tried to make consultation communication more effective. Numerous changes in resident education have occurred over the past decade. Resident duty hours and competency based developmental milestones have placed a spotlight on the importance of inter-professional communication. The consultation process lends itself extremely well to the assessment of this competency.

METHODS: In order to assess stakeholder opinions about the consult process, distinct web-based surveys were created and electronically disseminated to all categorical internal medicine residents and subspecialty medicine fellows during May 2014. We assessed barriers to communication at our institution, as well as if the key pieces of information in the consultation process remained the same. Finally, we asked participants if they felt that identified barriers were negatively impacting patient care. The survey was a compilation of 5-point Likert scale questions, Yes/No questions, and text box short answers. Descriptive statistics, student *t*-test and chi squared analysis were implemented.

RESULTS: Of 157 residents, 81 responded (52 %) and of 154 subspecialty consultants, 97 responded (63 %). Both groups agreed ($p > 0.20$ for all comparisons) that consult question, consult urgency, and whom to call with an answer were the three most important elements of a consult call. Resident confidence to convey a consult question (4.24) was statistically different from consultants' perceived competence of those residents' abilities (3.34), ($p < 0.01$). Similarly, resident perceived confidence to convey the urgency of a consult (4.32) and the consultant's perception of the residents' capacity (3.13) differed ($p < 0.01$). When choosing not to follow consultant recommendations, residents said that they called consultants 21 %, wrote in their note 75.3 %, and did nothing further 3.7 % of the time. Consultants stated that residents called them 3.1 %, wrote in their note 27.1 %, and did nothing 69.8 % of the time ($p < 0.01$ for all 3 comparisons between groups). Both groups felt that interactions were educationally rewarding (3.86 vs. 3.64, $p = 0.17$). They agreed that poor communication through the consultation process increased patient length of stay (3.67 vs. 3.21, $p = 0.07$), but tended to disagree that it caused more adverse patient outcomes (2.71 vs. 2.63, $p = 0.38$). One consultant's sentiment revealed this difference, "It is sometimes difficult to find the correct person to speak with about a patient and to give recommendations for what to do; this sometimes delays therapy or discharge."

CONCLUSIONS: Calling a consult continues to be an essential part of residency training. There is general agreement about the important aspects of consultation, but disagreement about the competence of those involved. The ACGME has placed an increased emphasis on this skill by delineating milestones that help to establish competency in inter-professional communication. A disconnect between residents and consultants is highlighted by the perceived communication differences when recommendations are not followed. Medicine subspecialty consultants felt that residents were unable to develop consult questions or determine consult urgency as well as the residents did. Direct observation of residents by experienced medical

educators may be a way to remedy this gap. Previously, consult question, consult urgency and patient identifier were shown to be the most important criteria of a consult call. Our survey has shown that "whom to call" has become even more important than the patient identifier. This correlates to the increased duty hour restrictions enforced for residents since 2011. It has become less commonplace for the daytime resident team to be available to speak with consultants who round in the late evening or nighttime hours. Our research highlights the communicative discord between residents and consultants. Potentially, hospital dynamics, work flow and patient length of stay could be negatively affected. This suggests the need for a formal curriculum for both residents and consultants, in order to improve consultation communication.

DEFINING PRIMARY CARE TEAM EFFORT FROM THE PRIMARY CARE PHYSICIAN'S PERSPECTIVE Johan S. Hong²; Steven J. Atlas¹; Jeffrey M. Ashburner¹; Clemens S. Hong¹. ¹Massachusetts General Hospital, Boston, MA; ²Brigham and Women's Hospital, Boston, MA. (Tracking ID #2199904)

BACKGROUND: Some patients require greater effort from primary care teams. Understanding the characteristics of such patients might help us better direct resources and redesign care to both improve patient care and reduce primary care team burnout. We characterized patients requiring greater primary care team effort as defined by their primary care physicians (PCPs).

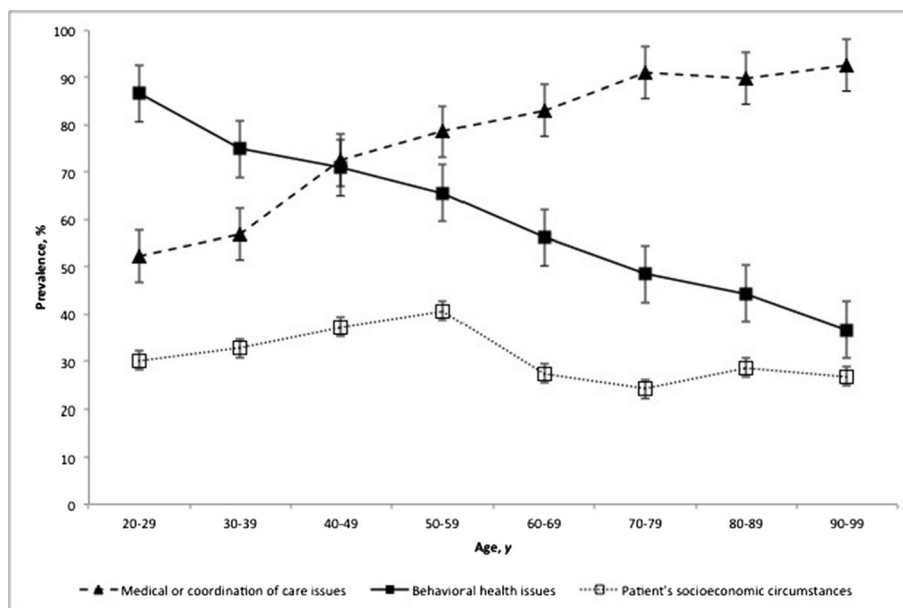
METHODS: We recruited all PCPs, from a large academic, primary care practice-based research network, who managed a panel of at least 100 patients in 2013. Participating physicians used an electronic survey tool to review a list of 100 of their randomly selected patients. After verifying that the patient was in their panel, the PCP answered the following question on 4-response scale (a lot of effort; a moderate amount of effort; a little effort; no effort at all): "How much effort does it take you and your team to care for this patient?" For higher-effort patients (that PCPs designated as requiring a lot or a moderate amount of effort), PCPs were asked what factors (medical/care coordination, behavioral health, and/or socioeconomic) contributed to the presumed high effort requirement. We compared sociodemographic, clinical, and utilization characteristics for higher-effort versus lower-effort patients using chi-square, Wilcoxon rank sum, and student *t*-tests. We also created eight adult age strata and assessed change in frequency with which PCPs identified medical/care coordination, behavioral health, and socioeconomic issues as contributors to "physician-defined" effort.

RESULTS: Among eligible PCPs, 54 % (99/184), representing 90 % (17/19) of network primary care practices completed the patient list review. The average age of PCPs was 49.3 years, 56 % were female, 35 % practiced in a community health center, and PCPs had worked an average of 14.9 years in their practice. These characteristics did not differ from non-participating PCPs. PCPs reviewed 9832 patients and designated 238 (2.4 %) as not one of their patients. Among the remaining 9594 patients, PCPs classified 23.7 % (range 3.0-55.8 %) as higher-effort. Among higher-effort patients, PCPs selected medical/care coordination (79.4 %), behavioral health (59.7 %), and socioeconomic issues (31.5 %) as contributors to higher physician-defined effort. With increasing age strata, medical/care coordination issues were more often cited, and behavioral health issues less often cited, as a contributors to physician-defined effort (Figure 1). Compared to lower-effort patients, higher-effort patients were older (60.9 vs 51.2 years old, $p < 0.001$), and more likely to be women (64.7 % vs 59.8 %, $p < 0.001$), reside in neighborhoods with lower median household income (\$58,892 vs \$69,798, $p < 0.001$) and be insured by Medicare (40.1 % vs 15.5 %, $p < 0.001$) or Medicaid (13.7 % vs 8.7 %, $p < 0.001$) rather than commercial insurers (44.0 % vs 72.7 %, $p < 0.001$). Compared to lower-effort patients, a greater proportion of higher-effort patients had a last serum creatinine level > 2.5 mg/dl (3.8 % vs 0.2 %, $p < 0.001$) and a greater proportion of higher-effort patients with diabetes that had last HbA1c levels greater than 9 % (6.1 % vs 1.2 %, $p < 0.001$). Higher-efforts patients also were more likely to carry a diagnosis of atrial fibrillation (11.9 % vs 2.8 %, $p < 0.001$), bipolar disorder (4.5 % vs 1.0 %, $p < 0.001$), have an alcohol-related problem (7.4 % vs 3.5 %, $p < 0.001$), or be prescribed selective serotonin reuptake inhibitors (3.6 % vs 0.7 %, $p < 0.001$), benzodiazepines (55.4 % vs 32.4 %, $p < 0.001$), or antipsychotics (0.6 vs 0.1 %, $p < 0.001$). Finally, a greater proportion of higher-effort patients had an emergency department visit (25.8 % vs 7.7 %, $p < 0.001$) in the last year.

CONCLUSIONS: PCPs in a large academic, primary care practices-based research reported that a quarter of a randomly selected subset of their patients required higher effort from their primary care teams. They identified medical,

behavioral health, and socioeconomic issues as contributors to primary care team effort. An improved understanding of the factors that contribute to primary

care team effort will help us appropriately allocate resources and redesign primary care to improve care and provider experience.



Medical, Behavioral Health, and Socioeconomic Issues Contributing to Primary Care Physician-defined Effort across Age Strata

DEFINING QUALITY OF RESIDENT WORK ROUNDS: IMPACT OF TEAM SIZE AND PGY-LEVEL Mayce Mansour²; Sheira Schlair¹; Sharon Leung³; Danit Arad³; Darlene LeFrancois³. ¹Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY; ²Montefiore Medical Center, New York, NY; ³Montefiore Medical Center, Bronx, NY. (Tracking ID #2194001)

BACKGROUND: Resident work rounds are an opportunity for internal medicine residents to oversee patient care, exercise leadership, and expand their knowledge base. Additionally, rounds are perceived as the primary venue for residents to develop their teaching skills, with prior work suggesting that feedback on directly-observed work rounds improves residents' confidence as educators. However, data on the content and quality of rounds is lacking, and the impact of resident training level and team size is not clear. We aimed to identify modifiable variables that may facilitate more effective resident work rounds. We hypothesized that smaller teams led by PGY3-residents would create a more educational work environment.

METHODS: We conducted this study on the inpatient service at Montefiore Medical Center (Bronx, NY), an urban, academic, tertiary-care hospital with 96 senior internal medicine residents. Resident work rounds occur every morning for approximately 45 min prior to attending rounds. The format of these rounds is determined by the supervising resident on the team. Medical teams consist of a senior resident, 1-4 interns and medical students, with 8-16 patients on a team. Individual resident work rounds were assessed by trained core faculty using the Teaching on Work Rounds (ToWR) feedback tool, a 31-item checklist consisting of five domains: (1) learning climate (8 items, e.g., allowing learners to articulate questions and plans without interruption); (2) teaching techniques (15 items, e.g., probing learners' understanding of cases and explaining clinical reasoning and supporting evidence); (3) leadership (5 items, e.g., time-management and role-modeling professionalism); (4) providing effective feedback (2 items, i.e., reinforcing feedback and noting errors/mistakes); and (5) lifelong learning (2 items, i.e., assigning questions to self and learner). A multivariate linear regression model was employed to examine the impact of team size (large teams >3 learners, small teams ≤3 learners), and PGY-level of team leader (PGY2, PGY3). Analysis was performed using STATA version 11.2. P-values <0.05 were considered significant.

RESULTS: Fifty-three resident work rounds were observed from 2012 to 2014; 64 % were PGY2-led and 36 % were PGY3-led. Overall, 57 % of learning climate items, 38 % of teaching technique items, 53 % of leadership items, 29 % of feedback items, and 14 % of lifelong learning items were employed. Residents most frequently employed checklist items in learning climate and teaching technique domains, while infrequently employing checklist items in feedback and fostering lifelong learning domains. Utilization of more

items in learning climate was associated with large teams and PGY2-led teams ($p=0.03$ and $p=0.05$, respectively). Comparing between PGY2s and PGY3s on small teams, PGY2s utilized more items in the learning climate and teaching techniques domains than their seniors ($p=0.02$ and $p=0.05$ respectively), whereas PGY3s more frequently gave effective feedback ($p<0.05$). Comparing small and large teams, both PGY2s and PGY3s leading large teams employed more items in the learning climate domain ($p=0.01$).

CONCLUSIONS: In our study, which focused on the content of resident work rounds using a validated feedback tool, we assessed the frequency of items utilized in five teaching domains and evaluated differences based on team-size and PGY-level. While our findings suggest that PGY2s may use a broader array of teaching techniques and promote a healthier learning climate as compared to PGY3s, PGY3s may more frequently demonstrate the advanced skill of providing feedback to their peers. Overall, residents were observed to infrequently provide feedback and promote lifelong learning. In the hierarchical and rushed climate of resident work rounds, these behaviors may involve more risk by requiring residents to admit gaps in knowledge-base and to role model self-doubt. Further, in contrast to some previous literature, residents who led work rounds on larger teams were observed to promote better learning environments. Study limitations include lack of randomization of team assignment, potential observer bias, and limited number of observations. Our analysis suggests potential areas for improvement of inpatient team-building and resident development. Programs may consider creating new curricula on effective feedback-giving and promoting habits of lifelong learning. Additionally, more focus placed on the transition from PGY2 to PGY3 years may promote the ongoing development of medical educator skills. Finally, our study suggests that composing larger inpatient teams with multilevel learners may foster an environment more conducive to academic development.

DEFINING THE INCIDENCE OF LACTIC ACIDOSIS IN PATIENTS PRESCRIBED METFORMIN WITH AND WITHOUT RISK FACTORS FOR LACTIC ACIDOSIS Katy E. Trinkley¹; Heather Anderson¹; Daniel Malone²; Kavita Nair¹; Joseph J. Saseen¹. ¹University of Colorado, Aurora, CO; ²University of Arizona, Tucson, AZ. (Tracking ID #2200814)

BACKGROUND: Metformin is the first line medication for type 2 diabetes (T2DM) because it has demonstrated reductions in both cardiovascular morbidity and mortality. Despite these overwhelming benefits of metformin, prescribing is suboptimal. Although the reasons for sub-optimal metformin use are unknown, it is likely that fear of precipitating lactic acidosis potentially hinders metformin use in certain at-risk patients (e.g., those with kidney or hepatic impairment, heart failure, older age, alcohol abuse, chronic obstructive pulmonary disease, history of lactic acidosis). It is also likely that prescribing is influenced by metformin's labeling, which includes contraindications and precautions for use in certain patients at-risk for lactic acidosis further hindering prescribing. In general, the risk of lactic acidosis with metformin use is minimal and similar to the general

population. Evidence suggests the risk of lactic acidosis is higher with sulfonylureas, which are commonly prescribed as an alternative to metformin when the risk of lactic acidosis is perceived to be high. Data assessing the risk of lactic acidosis with metformin are limited by small samples and the fact that these analyses did not attempt to quantify lactic acidosis risk factors. The purpose of this study was to describe the incidence of lactic acidosis in a large cohort of patients with T2DM and to estimate the association between metformin use, lactic acidosis, and risk factors for lactic acidosis.

METHODS: We conducted a retrospective cohort study of patients with newly diagnosed T2DM utilizing a 10% random sample of the IMS LifeLink Health Plan Claims Database. Patients with and without risk factors for lactic acidosis were included. T2DM medication exposure was classified as metformin only, other non-metformin medication(s), or no medication based on the first medication(s) filled following the index diabetes diagnosis. Risk factors for lactic acidosis were measured during the 6 months prior to index T2DM diagnosis. Incidence rates (IR) were calculated as the number of patients with lactic acidosis at least once during their follow-up divided by the total person-time at risk, reported as per 10,000 person-months. Incidence rates were stratified by medication group (metformin only, non-metformin, or no medication), and calculated for subsets of patients with each risk factor. Associations between diabetes medication exposure (metformin versus non-metformin versus no therapy) and lactic acidosis were estimated using relative risk (RR).

RESULTS: A total of 109,656 subjects met the definition of newly diagnosed T2DM: 18% were prescribed metformin monotherapy, 12% were prescribed non-metformin T2DM medications and 70% were prescribed no T2DM medications. The median age was 56 years (range 18–99) and 49% were female. There were a total of 211 patients with lactic acidosis diagnosed during the study period (mean follow-up=9.7 months). The mean number or risk factors per patient was 0.2 (14% of patients had one or more risk factors). The overall incidence of lactic acidosis was 2 per 10,000 person-months (95% confidence interval (CI): 1.7, 2.3). Incidence of lactic acidosis was significantly higher in the non-metformin medication group (IR=4.2, 95%CI: 2.8–6.3) compared to the metformin only group (IR=0.9, 95% CI: 0.5–1.8) and the no medication group (IR=1.9, 95% CI: 1.7–2.3). Risk of lactic acidosis was highest among patients with CKD (17.4 per 10,000 person-months) and with a history of lactic acidosis (42.1 per 10,000 person-months). The incidence of lactic acidosis was lower in the metformin group than the non-metformin and no medication groups for patients with all risk factors, except alcohol abuse (70.9 vs. 0 vs. 5.1 per 10,000 person-months, respectively). Each risk factor significantly increased risk of lactic acidosis, with RR estimates ranging from 2.3 (95% CI: 1.6, 3.5) for age \geq 80 years to 21.5 (95% CI: 5.3, 87.7) for having a history of lactic acidosis; however, this risk did not differ significantly across medication groups for any of the risk factors ($p\geq 0.05$). Adjusting for the number of risk factors did not significantly change the incidence of lactic acidosis within each medication group ($p\geq 0.05$).

CONCLUSIONS: The incidence of lactic acidosis was significantly lower among patients prescribed metformin compared to those prescribed other T2DM medications or no medication. When considering risk factors for lactic acidosis, the IR of lactic acidosis varies by comorbid conditions. Our results refute the notion that there is an increased risk of lactic acidosis with metformin use; rather, the estimated risk was lower when compared to no treatment or other medications. Based on these data clinicians should consider prescribing metformin among patients with risk factors for lactic acidosis.

DEMONSTRATING MEDICAL STUDENT COMPETENCY IN PRIMARY PALLIATIVE CARE: DEVELOPMENT AND EVALUATION OF A NEW “OSCE” STATION Andrew T. Putnam¹; Margaret Bia¹; Carol Pfeiffer²; Michael Green¹; Matthew S. Ellman¹. ¹Yale School of Medicine, New Haven, CT; ²University of Connecticut School of Medicine, Farmington, CT. (Tracking ID #2192194)

BACKGROUND: To meet the needs of the many patients living with complex and life-limiting illness, all physicians should achieve competency in primary palliative care. Diverse approaches to palliative care education exist in medical school curricula. In order to assess the effectiveness of teaching strategies and students skills, we need tools to evaluate students' competency in palliative care. Objective Structured Clinical Examinations (OSCEs), a widely accepted for evaluating student competency, have not been reported for primary palliative care. Our goal was to develop, implement, and assess the characteristics of a palliative care OSCE for 4th year medical students at our school who had completed a curriculum in palliative care.

METHODS: We created a representative clinical case and a performance checklist addressing 3 core, observable palliative care domains: Symptom management; Communication; Psychosocial, spiritual, and cultural aspects of care. We trained an experienced standardized patients (SP) then piloted and further refined the case and checklist. Over 2 consecutive years (pilot year and implementation year), all rising 4th year students completed the OSCE as the eighth case in a required 7 station assessment. The SP used the checklist to mark items as either performed or not performed. To evaluate the SP and ensure reliability, SP-student interactions were videotaped, monitored by remote observers

who independently scored 10% of the encounters. Based on reviews of the pilot year videotapes, analysis of students' performances, feedback from the SP and from 6 palliative care clinicians who completed the OSCE, we further refined the case and checklist for the implementation year. Inter-rater reliability of the OSCE stations was determined as the percent agreement between the SP and the remote observer. We performed standard item analyses including the difficulty index (percent students performing each item) and the discrimination index (point biserial correlations). We collected validity evidence related to content, internal consistency (Cronbach alpha), and relationship to other variables (correlation of palliative care OSCE scores with communication and history scores in the 7 other stations).

RESULTS: During the pilot year, 94 students (56% F, 44% M; mean age 27 [range 25–34]) scored an average of 64% (SD=12%) on 16 history items. There was 94% agreement in ratings on history items between the SP patient and the remote observer. The difficulty index ranged from 0.20 to 0.98 and the discrimination index for 15 of the 16 items was 0.16 to 0.52 (one question had a negative discrimination index of –0.18). For internal consistency, the Cronbach alpha was 0.34. The palliative care history scores correlated with overall communication (MIRS) score ($R=0.29$, $p=0.005$), but not with overall history scores ($R=0.12$, $p=0.24$) in the other 7 stations. In the implementation year, 95 students (47% F 53% M; mean age 28 [range 24–37]) scored an average of 74% (SD=13%) on the 14 history items. There was 95% agreement in ratings on history items between the standardized patient and the remote observer. The difficulty index on the 14 items ranged from 0.35 to 1.0. (Mean=0.606). The Cronbach alpha was 0.53, demonstrating moderate internal consistency. The palliative care history scores correlated well with both communication ($R=0.29$, $p=0.01$) and history scores ($R=0.61$, $p=0.01$) in the other 7 stations.

CONCLUSIONS: A new OSCE station to evaluate medical student competencies in palliative care was feasible to implement with high inter-rater reliability, moderate internal consistency and favorable correlations with communication and history scores in 7 other OSCE stations. Several challenges are instructive to highlight. Unlike a single problem encounter (e.g., back pain) amenable to a highly specific checklist of questions aimed at arriving at a differential diagnosis, the palliative care interview aims to expand the inquiry to larger domains in the patient's life. We developed a strategy to balance the desirability for open-ended questions with the need for the SP scorer to ascertain if students demonstrated the knowledge and skills to cover important palliative care domains. We also learned about the special challenges this type of case posed for even a highly experienced SP, who at the end of the pilot year felt proud of her accomplishments, but “burned out.” Using a professional actor as the SP for the implementation year as well as fictionalizing more aspects of the case mitigated this problem. We believe this OSCE is generalizable for use in other medical schools. Beyond its specific focus on palliative care, the OSCE emphasis on evaluation of a patient-centered, holistic bio-psycho-social-spiritual approach addresses competencies relevant to many types of clinical encounters.

DEPRESSION CARE MANAGEMENT: RESULTS FROM THE FIRST YEAR OF A COLLABORATIVE CARE MODEL IN AN URBAN ACADEMIC PRIMARY CARE CLINIC Susan Truong¹; Lauren Peccoraro². ¹Mount Sinai Medical Center, New York, NY; ²Mount Sinai School of Medicine, New York, NY. (Tracking ID #2192985)

BACKGROUND: Major depressive disorders are common and are often encountered by primary care practitioners. Yet many primary care providers in national surveys cite lack of access to mental health services and shortage of mental health providers as barriers to providing their patients with optimal care. Collaborative care models have been designed to address this growing need. The model consists of interventions that utilize non-physician case managers who work closely with primary care physicians and mental health specialists. Interventions vary from development of care management plans in order to improve medication adherence to more multifaceted models involving intensive management in psychotherapy programs. While the success of these programs has been shown in a number of clinical settings, little is known about the impact of such a program in an academic training clinic where primary care providers range in their experience from trainees to attendings. The purpose of this study is to determine whether the implementation of a collaborative care program improves depression outcomes for patients in an urban academic primary care clinic.

METHODS: Patients at the Internal Medicine Associates (IMA) practice at the Mount Sinai Medical Center were invited to participate in the Depression Care Management Program who met the following criteria: Age over 18, clinically significant depression as measured by a Patient Health Questionnaire 9 (PHQ-9) score greater than 10 and meeting criteria for major depressive disorder by the DSM IV definition. The program consisted of universal depression screening, weekly to bi-weekly sessions with a behavioral health social worker trained in Problem Solving Therapy, Interpersonal Therapy and Behavioral Activation Therapy. Their symptoms were measured by PHQ9 questionnaires at each follow up visit and at the end of treatment. New and complex cases were reviewed weekly

with two primary care physicians and a psychiatrist consultant. Recommendations and updates regarding the patient's status were relayed back to the patient's primary care provider. The data for screening were analyzed as descriptive data. The data for patient outcomes were analyzed as intention to treat by a paired student's *t*-test using Microsoft Excel software.

RESULTS: From July 2013 through June 2014, screening rates improved from 22 % in July 2013 to 72 % in June 2014. From Jan 2014 to June 2014 a total of 7076 patients were screened for depression (72 % screening rate), with 1802 screening positive by the PHQ2 (25 %) and 648 diagnosed with depression (9 %). Five hundred twenty-seven patients were referred to the Depression Care Management Program in the study period. Of these patients, 124 enrolled. The mean initial PHQ9 score was 13.5 (SD 3.7). Data were available for 115 participants by the end of the year period. Seventy-five patients (60 %) were in active treatment and 49 (40 %) had completed treatment and were in relapse prevention. The mean follow up PHQ9 score was 8.3 (SD 4.3) for a decrease in PHQ9 score by 5.2 or 39 % ($p < 0.001$). One hundred one patients had an improvement in their PHQ9 scores (82 %). Forty-eight patients had a > 50 % decrease in their PHQ9 scores (40 %) and 75 patients had PHQ9 scores < 10 (60 %).

CONCLUSIONS: Patients referred to the Depression Care Management Program had significant improvement in their depression as measured by their PHQ9 scores. These data support findings from previous studies of collaborative care models for the treatment. Further research is needed to determine the long term effect of these care models on patients' mental health outcomes as well as the impact on medical comorbidities and comparisons with those patients not enrolled in the program.

DEPRESSIVE SYMPTOMS ARE ASSOCIATED WITH POORER ANTIRETROVIRAL ADHERENCE AND LESS VIRAL SUPPRESSION AMONG HAZARDOUSLY DRINKING HIV-INFECTED WOMEN Kristin C. Darwin; Heidi Hutton; Geetanjali Chander. Johns Hopkins University, Baltimore, MD. (Tracking ID #2199121)

BACKGROUND: We sought to determine socio-demographic, substance use, and mental health correlates of antiretroviral therapy (ART) adherence and HIV RNA viral suppression among hazardously drinking HIV-infected women.

METHODS: We performed a secondary analysis of baseline, 6-month, and 12-month data collected from HIV-infected women receiving care in the Johns Hopkins HIV Clinic between 2006 and 2011. We defined hazardous alcohol use as ≥ 7 drinks/week or binge drinking in the last 90 days. Outcomes included ART adherence (binary variable determined with the question: "Have you missed a dose of your HIV medication in the last 3 days?") and HIV1-RNA suppression (undetectable if < 400 copies/mL). We assessed anxiety and depressive symptoms using Hospital Anxiety and Depression Scale (HADS) cumulative scores. Other independent variables included age, race, housing status, marijuana use, cocaine use, and heroin use. Stratifying by hazardous alcohol use, we performed multivariable logistic regression using Generalized Estimating Equations to account for clustering.

RESULTS: Of 385 women, 115 were hazardous drinkers at baseline. The median age of the sample was 46 and 86 % were African American. Hazardous drinkers were more likely to use cocaine ($p < 0.001$), marijuana ($p = 0.002$), heroin ($p < 0.001$), were less likely to have stable housing ($p = 0.002$), and had higher anxiety ($p = 0.003$) and depressive symptoms ($p = 0.003$). In multivariable analysis, depressive symptoms among hazardous drinkers were associated with higher odds of ART nonadherence (OR 1.18; $p = 0.03$) and lower odds of viral suppression (OR 0.86; $p = 0.05$). Hazardously drinking women with stable housing were more likely to have an undetectable viral load (OR 2.46; $p = 0.04$) compared to those living in someone else's house/apartment, a hotel, a shelter, or a halfway house/transitional housing. Among non-hazardous drinkers, cocaine (OR 0.53; $p = 0.04$) and marijuana use (OR 0.64; $p = 0.05$) were associated with decreased viral suppression. Other independent variables were not significantly associated with outcomes.

CONCLUSIONS: Among hazardously drinking HIV-infected women, depressive symptoms are associated with lower antiretroviral adherence and viral suppression. These findings underscore the importance of screening for depressive symptoms among hazardously drinking women, and screening for hazardous drinking among women with depressive symptoms. Recognition and treatment of these co-occurring conditions among HIV-infected women may improve outcomes.

DESIGN AND VALIDATION OF AN INSTRUMENT TO DETECT DIAGNOSTIC ERRORS IN PRIMARY CARE SETTINGS Aymer Al-Mutairi^{1, 2}; Ashley N. Meyer²; Eric J. Thomas³; Jason M. Etchegaray⁴; Kevin M. Roy¹; Caridad Davalos¹; Hardeep Singh². ¹Baylor College of Medicine, Houston, TX; ²Michael E. DeBakey Veterans Affairs Medical Center and Baylor College of Medicine, Houston, TX; ³The University of Texas Medical School at Houston, Houston, TX; ⁴UT Medical School at Houston, Houston, TX. (Tracking ID #2198503)

BACKGROUND: Diagnostic errors in primary care are common and harmful but difficult to define and measure. Measurement of diagnostic errors depends mainly on detailed retrospective review of patients' medical records, a process that often results in reviewer disagreement and kappas of less than 0.4. We developed and validated a data collection instrument to detect diagnostic errors and improve reviewer agreement as a first step in informing a comprehensive future methodology of diagnostic error measurement in the primary care setting.

METHODS: We first culled questions from several instruments previously used in research on diagnostic error measurement. We then developed and refined an instrument to detect diagnostic errors using multidisciplinary group input and iterative medical record reviews. For testing the new instrument, we selected a sample of patients with and without diagnostic errors to represent the "gold standard". Primary care encounters of certain patients in this cohort were determined to contain diagnostic errors by at least 2 independent reviewers in a previous study. These reviewers evaluated the medical record in hindsight for missed opportunities to make a correct/timely diagnosis based on the available documented evidence. The tool was validated by comparing original gold standard results with new results of error determination by a single blinded physician who used the newly developed instrument. A total of 389 patient records were reviewed from the original study: 129 cases with diagnostic errors and 260 cases without.

RESULTS: The final tool consisted of 11 questions that objectively assessed the appropriateness of the patient-provider encounter in terms of diagnostic processes such as history, physical examination, and testing and 1 final question on presence or absence of diagnostic error as determined through a Likert-type scale of 1 to 6 (Table 1). When comparing presence of diagnostic error (final question rating 1-3 as determined by the single physician) to the gold standard, the tool yielded an overall accuracy of 84 %, sensitivity of 71 %, specificity of 90 %, negative predictive value of 86 %, and positive predictive value of 78 %. Using Spearman's correlations, all 11 items correlated significantly with the error outcome (all p -values $\leq .001$). The 11 diagnostic process questions clustered into three domains: initial diagnostic assessment, performance and interpretation of diagnostic tests, and patient factors, with Cronbach's alpha coefficients of 0.93, 0.92, and 0.38 associated with the three domains respectively.

CONCLUSIONS: We achieved a high degree of accuracy and positive predictive value for presence of diagnostic error using a new measurement tool. Because of reduced reliance on subjectivity, this tool could improve inter-physician agreement on diagnostic errors and be useful to enhance learning and feedback about diagnostic safety in primary care settings.

An instrument to determine presence or absence of diagnostic error on a primary care encounter.

Rate the following items for the episode of care under review[i]: 1—2—3—4—5—6

1=Strongly Agree 6=Strongly Disagree

1. The history that was documented at the patient-provider encounter was suggestive of an alternate diagnosis, which was not considered in the assessment.
2. The physical exam documented at the patient-provider encounter was suggestive of an alternate diagnosis, which was not considered in the assessment.
3. Diagnostic testing data (laboratory, radiology, pathology or other results) associated with the patient-provider encounter were suggestive of an alternate diagnosis which was not considered in the initial assessment.
4. The diagnostic process at the initial assessment was affected by incomplete or incorrect clinical information given to the care team by the patient or primary caregiver.
5. The clinical information (i.e. history, physical exam or diagnostic data) present at the initial assessment should have prompted additional diagnostic evaluation through tests or consults.
6. The initial assessment was appropriate given the patient's medical history and clinical presentation.
7. Alarm symptoms or "Red Flags" (i.e. features in the clinical presentation that are considered to predict serious disease) were not acted upon at the initial assessment.
8. Diagnostic data (laboratory, radiology, pathology or other results) available or documented at the initial assessment were misinterpreted in relation to the subsequent final diagnosis.
9. The differential diagnosis documented at the initial assessment included the subsequent final diagnosis.
10. The final diagnosis was an evolution of the initial presumed diagnosis.
11. The clinical presentation was not typical of the final diagnosis.
12. In conclusion, based on all the above questions, the episode of care under review had a diagnostic error.

[i] In all questions, a rating of 1 most likely represented a diagnostic error and a rating of 6 indicated that no error was identified, except question 6, 9 and 10 were rating was reversed.

DESPITE HIGH PREVALENCE, DEPRESSION IS ASSOCIATED WITH LESS HEALTHCARE UTILIZATION IN JAPAN Osamu Takahashi; Gautam A. Deshpande; Sachiko Ohde. St. Luke's Life Science Institute, Tokyo, Japan. (Tracking ID #2200343)

BACKGROUND: Depression is one of the most common mental disorders in the general population, and may be of particular importance in Japan, which has the 7th highest suicide rate globally. As previous literature suggests that depressed patients are often identified and treated by primary care physicians (PCP), access to primary care is important in the management of the disease. We aimed to evaluate the prevalence of depression in the general Japanese population, hospital utilization rates for depression, and factors related with access to PCPs among depressed patients.

METHODS: This was a cross-sectional study. A population weighted random sample from a nationally representative panel of adults (≥ 20 years) was used to estimate health care utilization based on a prospective health diary recorded over one month. A baseline, pre-diary questionnaire was used to capture demographic data, lifestyle habits, access to a PCP, and socioeconomic status (SES) parameters including family income, education level, and type of family. Depression was defined as a score of >9 on the Patient Health Questionnaire (PHQ-9).

RESULTS: Three thousand seven hundred twenty-two people were included in this study (mean age, 52 years old (SD, 18); 1758 (47.2 %) men.) The prevalence of depression was 27.1 % ($n=1007$), among whom 55 (5.5 %) were already diagnosed with depression. Using multivariate logistic regression, the risk factors for depression included female gender (OR: 1.2), lower educational attainment (OR: 1.1), low family annual income ($< \$30,000$, OR: 1.7), obesity (BMI ≥ 25 kg/m², OR: 1.3), and past history of depression (OR: 4.7). Of the 995 without a baseline diagnosis of depression, 308 (31 %) visited a hospital in the subsequent one month [f1]. Multivariate logistic regression revealed that factors related to non-utilization of healthcare services included living in a rural area (OR: 2.1), younger age (OR: 3.0), and not having a PCP (OR: 3.2); SES was not associated with healthcare utilization by those with depression in Japan.

CONCLUSIONS: Depressive disorders are highly prevalent in the Japanese general population. Most depressive patient demonstrated less access a PCP and underdiagnosis was common. Identification of depression in Japan may be improved by increasing access to PCPs.

DETERIORATION TO DOOR TIME: AN ANALYSIS OF DELAYS IN ESCALATION OF CARE FOR HOSPITALIZED PATIENTS Christopher Sankey^{1,2}; Gail McAvay¹; Jonathan M. Siner^{1,2}; Carol L. Barsky²; Sarwat Chaudhry^{1,2}. ¹Yale School of Medicine, New Haven, CT; ²Yale-New Haven Hospital, New Haven, CT. (Tracking ID #2196159)

BACKGROUND: The identification of clinically deteriorating patients on general inpatient floors and the timely escalation of their care continue to present significant challenges to medical providers and health systems. Clinical deterioration that occurs after admission

to a general floor has been associated with an increased risk of death. Unanticipated transfers from a general floor to the intensive care unit (ICU) are implicated in a considerable proportion of ICU admissions, hospital deaths, and hospital days. The early period of deterioration may represent a time at which admission to the ICU is associated with improved survival, particularly among patients who experience deterioration on hospital floors. The few existing studies examining the relationship between the delay from onset of clinical deterioration to ICU transfer and mortality were conducted over a decade ago; the prevalence of delays in escalation of care for deteriorating inpatients in the contemporary era of Hospital Medicine is therefore not currently known.

METHODS: This study is a retrospective data analysis of 728 included transfers from non-ICU inpatient floors to the medical intensive care unit (MICU), occurring from 2011 to 2013 at Yale-New Haven Hospital (YNHH). YNHH is an academic tertiary medical facility in New Haven, Connecticut with approximately 1000 bed capacity and 50,000 discharges annually. Deterioration to door time (DTDT) was defined as the time between onset of clinical deterioration (as evidenced by the presence of one or more vital sign indicators) and arrival in the MICU. Clinical deterioration was defined by the following vital sign abnormalities: respiratory rate greater than 28 or less than 8 breaths per minute, systolic blood pressure greater than 200 or less than 90 mmHg, and pulse greater than 130 or less than 40 beats per minute.

RESULTS: The overall in-hospital mortality was 17.9 %. 20.9 % of the sample had DTDTs of 3–4 h, the designated reference category; approximately one-fifth of patients had shorter DTDTs and 57 % had longer times. Starting at a DTDT of 5 h, there was a progressive increase in un-adjusted mortality with increasing DTDT. The association between DTDT and in-hospital mortality followed a similar pattern after adjustment for age, sex, and severity of illness. The observed mortality in the DTDT group of 0–2 h likely reflects high clinical acuity in the most clearly clinically decompensating (“crashing”) patients who appropriately experienced immediate care escalations.

CONCLUSIONS: Our study demonstrates that delays in the escalation of care for clinically deteriorating patients on general medical floors remain common in the contemporary era of Hospital Medicine, occurring in greater than 50 % of patients transferred to the MICU, and are associated with in-hospital mortality. Development of performance measures for the care of clinically deteriorating inpatients remains essential, and DTDT may be an appropriate metric.

Deterioration to Door Time (DTDT) and In-Hospital Mortality (N=728)

DTDT	Deaths	Un-adjusted Mortality: HR(95 % CI); p-value	Adjusted Mortality*: HR(95 % CI); p-value
0–2 h	31 (19.3 %)	1.68 (0.94, 3.00); .080	1.74 (0.97, 3.11); .063
3–4 h	18 (11.8 %)	Reference Group	Reference Group
5–9 h	19 (13.6 %)	1.15 (0.61, 2.20); .666	1.34 (0.70, 2.56); .377
10–27 h	27 (20.2 %)	1.70 (0.94, 3.09); .081	1.98 (1.09, 3.60); .026
28–72 h	35 (24.8 %)	1.95 (1.11, 3.45); .021	2.32 (1.30, 4.12); .004

*Cox regression model, controlling for age, sex, and severity of illness.

HR, Hazard Ratio

CI, Confidence Interval

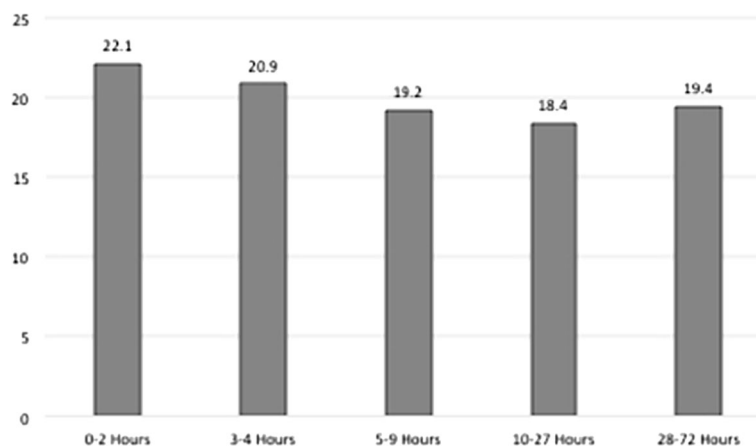


Figure. Distribution of Deterioration to Door Time (%)

DETERMINANTS OF FUNCTIONAL RECOVERY IN OLDER ADULTS WITH HIP FRACTURE Victoria Tang; Rebecca L. Sudore; Alexander K. Smith; Christine Ritchie; Margaret I. Wallhagen; Irena Stijacic Cenzer; Ken Covinsky. University of California, San Francisco, San Francisco, CA. (Tracking ID #2178217)

BACKGROUND: Although disability and death is common after hip fracture, and the majority of patients never return to their prefracture level of function, some patients do recover. Most studies assess functional status at the time of hip fracture. However, a more accurate comparison of pre to post functional status would include functional status data before a hip fracture has occurred. Using functional status assessments over time among a U.S. national sample, our goal was to determine the proportion of older adults who recover to their pre-hip-fracture function and to identify characteristics of recovery.

METHODS: We analyzed longitudinal data from the nationally-representative Health and Retirement Study (HRS) linked to Medicare claims. We included 733 participants who were ≥ 65 years of age and who sustained a hip fracture. To identify pre-fracture function we used the most proximal pre-fracture interview (11.6 months \pm 7.4 before hip fracture). To identify post-fracture function, we used the information from interviews conducted between 6-months to 2.5 years after their fracture (12.5 months \pm 8.1) or time of death. Our goal was to determine the proportion of patients who returned to their pre-fracture functional status as measured by two outcomes: (1) number of six activities of daily living (ADL, e.g., bathing, dressing, etc.) in which they needed assistance (scale of 0–6), and (2) level of mobility (scale of 0–2) defined by their ability to walk one block or across the room. Participants who died prior to their post fracture interview were categorized as not returning to their prior functional status. We examined demographic, clinical, and social determinants of recovery. For each determinant, we used logistic regression to calculate predicted recovery rates adjusting for age and gender.

RESULTS: The mean age of participants was 84 ± 7 years and 77 % were women. Thirty-one percent recovered to their pre-fracture ADL function and 34 % returned to their pre-fracture mobility level. ADL recovery was significantly associated with age younger than 85 vs ≥ 85 (39 % vs 22 %, $p=0.04$), female gender (33 % vs 23 %, $p<0.001$), no history of dementia vs dementia (35 % vs 10 %, $p<0.001$), residing in the community vs institutionalized (32 % vs 14 %, $p=0.006$), and having a Charlson comorbidity score of <3 vs ≥ 3 (37 % vs 22 %, $p<0.001$). These same patient characteristics were also significantly associated with returning to pre-fracture level of mobility ($p<0.05$). Being White vs Black (31 % vs 20 %, $p=0.04$), no prior falls vs a prior fall (34 % vs 26 %, $p=0.03$) and \geq high school education vs lower education (33 % vs 26 %, $p=0.04$) were also associated with ADL recovery, but not mobility recovery.

CONCLUSIONS: In this older adult cohort, one third of participants with hip fracture returned to their previous level of function. Understanding the demographic, clinical and social risk factors associated with recovery and non-recovery may allow clinicians to better design and tailor rehabilitation programs for the oldest old, set realistic expectations for recovery, and better plan for long-term discharge needs.

DEVELOPMENT AND VALIDATION OF THE SPANISH SHORT NUMERACY UNDERSTANDING IN MEDICINE INSTRUMENT Elizabeth Jacobs²; Cindy Walker⁶; Tamara Miller¹; Kathryn Fletcher²; Pamela S. Ganschow³; Diana Imbert³; Maria O'Connell³; Joan Neuner¹; Marilyn M. Schapira⁴. ¹Medical College of Wisconsin, Milwaukee, WI; ²Milwaukee VAMC/Medical College of Wisconsin, Milwaukee, WI; ³Stroger Hospital/Rush University Medical Center, Chicago, IL; ⁴University of Pennsylvania, Philadelphia, PA; ⁵University of Wisconsin School of Medicine and Public Health, Madison, WI; ⁶University of Wisconsin at Milwaukee, Milwaukee, WI. (Tracking ID #2196350)

BACKGROUND: The Spanish-speaking population in the US is large and growing. This population is known to have lower health literacy, a known risk factor for health disparities. Much less is known about health numeracy in this population because of a dearth of measures that have been developed for use in Spanish. Our objective in this work was to develop and validate a short and easy to use measure of health numeracy for Spanish-speaking adults in the United States: the Spanish Short Numeracy Understanding in Medicine Instrument (S-NUMi).

METHODS: Items were generated based upon qualitative studies with both English and Spanish-speaking adults. A 20-item NUMi and 8-item S-NUMi were first created and psychometrically evaluated and validated in English; both of these instruments have been published in the literature. We translated all items into Spanish using a group translation and consensus process and cognitive interviews were conducted to ensure we were measuring the same concepts in Spanish as in English. We then conducted Differential Item Functioning analyses to evaluate whether or not the items on the English S-NUMi functioned in the same way for Spanish speaking examinees, using a sample of 232 Spanish-speaking residents from Chicago and Milwaukee. To determine the reliability and validity of the measure, cronbach's alpha was computed as a measure of reliability and

scores on the Spanish S-NUMi were correlated with the Spanish Test of Functional Health Literacy (S-TOFHLA). In addition, differential validity was examined by comparing scores on the Spanish S-NUMi for examinees of different education levels.

RESULTS: The study population was diverse in age, gender, and level of education and 70 % reported Mexico as their country of origin. Two of the items originally included in the English S-NUMi demonstrated poor psychometric properties in Spanish, one was found to have differential item functioning while another was found to have low discrimination. These items were eliminated, leaving 6 items that measured the range of important numerical concepts used in healthcare communication: 4 from the number sense domain, 1 from the tables & graphs domain, and 1 from the probability domain. The 6-item Spanish NUMi demonstrating adequate reliability, with a Cronbach's alpha of 0.72. Items demonstrated a range of difficulty using classical test statistics (0.48 to 0.86) and adequate discrimination (0.34–0.49). Scores on the overall instrument were positively correlated with print literacy as measured by the S-TOFHLA (0.67) and varied as predicted across grade level; mean scores for up to 8th grade, 9–12th grade, and some college experience or more, respectively, were 2.48 (1.64), 4.15 (1.45), and 4.82 (0.37); with higher scores indicating higher numeracy.

CONCLUSIONS: We have documented that the Spanish S-NUMi is a reliable and valid measure of the range of important numerical concepts that are used in understanding and communicating health information. This is an easy to use, very brief measure of health literacy that could be used in a range of settings to assess the health numeracy of Spanish speakers, particularly in the United States.

DEVELOPMENT OF A TAILORED, 5A'S-BASED WEIGHT MANAGEMENT INTERVENTION FOR VETERANS WITHIN PRIMARY CARE Katrina F. Mateo^{1, 2}; Sandeep Sikerwar^{1, 2}; Allison Squires^{3, 2}; Adina Kalct²; Scott Sherman^{1, 2}; Melanie Jay^{1, 2}. ¹VA NY Harbor Healthcare System, New York, NY; ²NYU School of Medicine, New York, NY; ³New York University, New York, NY. (Tracking ID #2197583)

BACKGROUND: Obesity affects 36 % of patients in the Veterans Health Administration. The United States Preventive Services Task Force endorses the use of the 5As framework (Assess, Advise, Agree, Assist, Arrange) to deliver obesity counseling in primary care (PC). This study used qualitative methods to inform the development of a 5As-based weight management intervention to improve obesity care at Veterans Affairs (VA) Medical Centers.

METHODS: We conducted a secondary analysis of 6 focus group sessions with Veteran patients and 25 interviews with key VA staff in PC (physicians, nurses, and MOVE! staff) in order to guide intervention development. We asked Veterans and staff to provide feedback on a proposed 5As intervention initially conceived based on prior work and a systematic review of the literature. This proposed intervention would use an online tool to deliver the 5As by assessing health behaviors and barriers ("assess"), providing tailored advice ("advise"), and helping patients set goals ("agree"). Members of the healthcare team would then discuss goals further, focusing on addressing barriers ("assist") and providing follow-up/referral to more intensive support ("arrange"). Participants were also asked about their experiences with goal setting, weight management, and technology. Focus group and interview sessions were audio-recorded, professionally transcribed, and coded using a rigorous process previously described. To guide intervention development, transcription segments originally coded as "goal-setting," "proposed intervention," and/or "technology" were analyzed. The "proposed intervention" code had not been previously analyzed.

RESULTS: Both Veterans and VA staff held positive views toward the use of goal setting for healthy behavior change and stressed the importance of social support in achieving goals. Veterans particularly felt the need for someone to hold them accountable for their goals and give them consistent feedback on their progress. VA staff felt that the goals needed to come directly from the patient and that the providers' role was to support the process. Veterans and staff reported mixed attitudes toward technology, acknowledging that some patients were unfamiliar with or distrusting of technology. When asked to give feedback about the proposed intervention, Veterans and staff liked that it would provide individualized counseling and support from the healthcare team to achieve goals. However, some Veterans did not believe a computer could generate individualized advice and did not want technology to replace human support. Most healthcare team members felt that time constraints would be a barrier to implementation and indicated that they could not spend more than 3–5 min on weight management. As a result of these findings, our revised intervention includes the use of a health coach to provide in-person support while using the online tool. The health coach will also provide initial counseling about weight loss and lifestyle goals to allow the healthcare team to focus their time on performing brief counseling to address barriers and endorse the goals.

CONCLUSIONS: This study informed the development of a 5As intervention to improve the treatment of obesity in the PC setting. Usability testing of the online tool is currently ongoing, and pilot testing of the intervention will begin soon.

DEVELOPMENT OF AN ONLINE WEIGHT MANAGEMENT TOOL TO FACILITATE COLLABORATIVE GOAL SETTING FOR VETERANS IN PRIMARY CARE Katrina F. Mateo^{1,2}; Natalie Berner^{1,2}; William Vabrinkas^{2,1}; Adina Kalet²; Scott Sherman^{1,2}; Melanie Jay^{1,2}. ¹VA NY Harbor Healthcare System, New York, NY; ²NYU School of Medicine, New York, NY. (Tracking ID #2197556)

BACKGROUND: Obesity is highly prevalent at Veterans Affairs (VA) Medical Centers, but healthcare teams often fail to counsel patients to lose weight due to competing demands. Tools are needed to facilitate obesity counseling in the primary care (PC) setting. Goal setting can promote weight loss, and expert system software programs may be able to facilitate goal setting. Based on formative data, we created an interactive online tool to facilitate goal setting for lifestyle behavior change in PC at the VA. We then conducted usability testing to further refine this tool and understand best strategies for its use among Veterans.

METHODS: We used principles of User-Centered Design with stakeholder input from 6 focus groups with Veterans, 25 key informant interviews with healthcare team members, and 6 usability studies of the VA's MOVE! online questionnaire to create an interactive online tool to help overweight/obese Veterans create initial weight management goals and facilitate obesity-related counseling by a health coach and/or healthcare team. We then conducted usability testing using a "Think Aloud" protocol where a moderator observed each participant using the tool on a tablet computer as they verbalized thoughts/reactions. This was followed by a 15-min health coaching session and a semi-structured interview to elicit reflections on the experience. Sessions were digitally recorded, professionally transcribed, and analyzed to identify areas for tool improvement.

RESULTS: The resulting tool, called MOVE! Toward Your Goals (MTG), was designed at a 5th grade literacy level with low text density per page and simple navigation. The MTG tool uses the following algorithm: The patient completes a questionnaire about weight, barriers to weight loss, and lifestyle behaviors; each answer generates tailored weight loss or behavior change advice. The patient then indicates how much weight he or she wants to lose and assigns a number (1–10) indicating the perceived importance of each piece of advice. Based on this information, the tool guides the patient to choose a weight loss goal, up to 2 nutrition goals, and a physical activity goal. The tool then provides links for the coach (or healthcare team member) to print out an individualized patient summary (health advice and initial goals), SMART goal setting worksheet, VA weight management resources, tailored educational handouts, and a report for the coach. The role of the coach is to help the patient make the goals "SMART" (specific, measurable, attainable, relevant, and time-based), address potential barriers, and link the patient to more intensive VA and community resources. Usability testing of the MTG tool with 5 Veteran participants (3 male, 2 female) revealed that they appreciated the clean visual layout, the in-person support while using the tool, and had a strong positive reaction to the health coaching session and personalized binder of printouts. They left the session feeling motivated to work on their goals. Identified barriers to tool use included problems with tool navigation, tablet use, and unclear wording of some questions.

CONCLUSIONS: Initial usability testing suggests that the MTG tool can facilitate collaborative goal setting. Findings will inform iterative changes and usability testing is ongoing. The MTG tool will then be tested as part of a pilot randomized controlled trial of a primary care-based weight management intervention at the VA.

DEVELOPMENT OF OBESITY AND RELATED DISEASES IN A PROSPECTIVE LONGITUDINAL COHORT OF AFRICAN REFUGEES COMPARED TO MATCHED REGIONAL CONTROLS Corinne Rhodes; Sanja Percac-Lima. Massa-

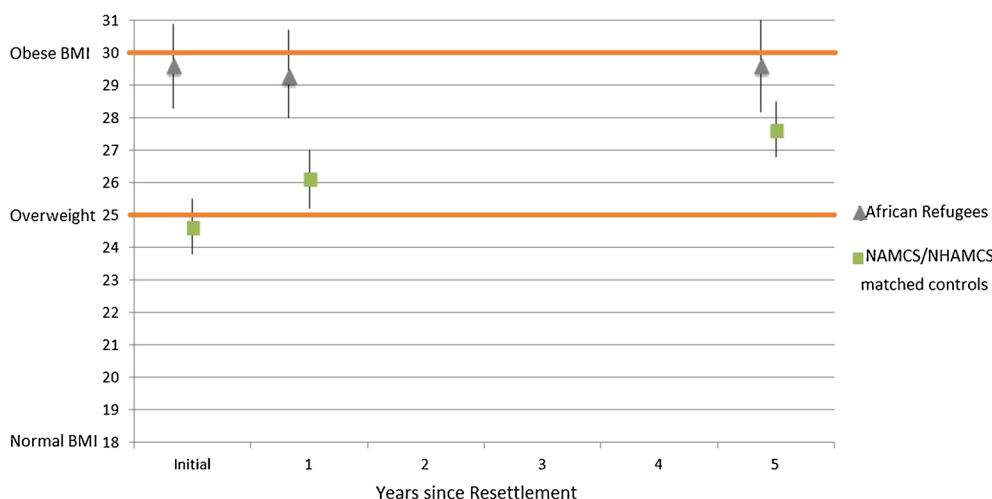
chusetts General Hospital, Harvard Medical School, Jamaica Plain, MA. (Tracking ID #2190044)

BACKGROUND: Refugees qualify for 8 months of Medicaid on arrival to the United States, but few resources are available to track and study longitudinal health of this population. This study's objective was to explore development of obesity and related disease in refugees from Africa after resettlement in the US. We hypothesized African refugees' body mass index (BMI) would significantly increase after resettlement.

METHODS: We obtained a comprehensive list of 938 refugees who arrived in Rhode Island (RI) between 2004 and 2007 from the Department of Health. We followed the medical records of 354 refugees ≥ 18 years old cared for in the largest RI state hospital system to obtain BMI closest to 3 time points (initial system interaction, 1 year, and 5 years) as well as obesity related diagnoses (hypertension (HTN), hyperlipidemia (HL), and diabetes mellitus (DM)) at arrival and at 5 years. One hundred seventy-five Refugees were excluded due to pregnancy or limited BMI information. Changes in continuous data were analyzed with student t-tests or ANOVA and categorical data was analyzed with Fisher's exact tests. Refugee BMI time trends for longitudinal person-clustered refugee data were analyzed using mixed regression models. To account for regional trends in BMI and rates of obesity-related diseases we constructed comparison U.S. populations from the National Ambulatory Medical Clinic and National Hospital Ambulatory Medical Clinic Surveys (NAMCS/NHAMCS). We matched each refugee visit in a 1:1 ratio to a randomly selected NAMCS/NHAMCS visit by gender, race, age (± 1 year), and clinic visit year (± 2 years). Regional BMI trend for NAMCS/NHAMCS cross-sectional visits was analyzed using linear regression.

RESULTS: Of 178 adult refugees from the largest RI hospital system with multiple BMIs recorded, 164 (92.1 %) were African, and 156 were matched to the NAMCS/NHAMCS population. Refugees were primarily women (60.9 %), mean age 38.4 (SD 14.5), and predominantly Liberian (110, 70.5 %). At baseline, African refugees had a mean BMI of 24.8 (4.9), 4.5 % were underweight (BMI < 18.5), and 11.5 % were obese (BMI > 30). Rates of DM, HTN, and HL were 0.6, 16.7, and 2.6 %, respectively. One hundred seventy-five non-pregnant adult refugees with limited BMI data had similar demographics, baseline BMI, and rates of obesity related diseases. In the NAMCS/NHAMCS population BMI was significantly higher at 29.5 (SD 8.0, $p < 0.0001$), 1.8 % were underweight ($p = 0.03$), and 36.2 % were obese, ($p < 0.0001$). Rates of DM, HTN, and HL compared to refugee rates were 11.7 % ($p < 0.0001$), 19.1 % ($p = 0.22$), and 11.9 % ($p = 0.0003$) respectively. BMI trend over time was significant for refugees ($p < 0.0001$) with mean BMI trending from 24.8 (SE 0.44) at initial time point to 26.1 (0.44) at 1 year, and 27.6 (0.44) at 5 years. For the NAMCS/NHAMCS population, the BMI time trend was not significant ($p = 0.94$) with a mean BMI of 29.6 (SE 0.99) at the initial time point, 29.3 (0.99) at 1 year, and 29.6 (0.71) at 5 years, (Figure 1, with 95 % confidence intervals). Rates of DM2 and HL increased in refugees from initial time point to 5 years ($p = 0.0007$, 0.006) but not in the NAMCS/NHAMCS population ($p = 0.64$, 0.35). Rates of hypertension were not significantly different in either population. A sensitivity analyses in Liberians vs. non-Liberian Africans showed similar baseline BMIs (24.7 vs. 24.3 $p = 0.14$), rates of obesity and obesity related diseases, and similar regression model trends.

CONCLUSIONS: Our results reveal that African refugees gain weight after arrival to the US with mean BMI crossing from the normal to overweight category within the first year. This increase in BMI is not explained by regional U.S. trends as reflected by our NAMCS/NHAMCS comparison population. Early education about obesity, nutrition, and health during the resettlement process is essential to prevent development of obesity and obesity related diseases in this vulnerable population.



BMI trends in African refugees compared to matched controls

DIABETES AND RISK OF INCIDENT DEPRESSIVE SYMPTOMS AMONG OLDER LATINOS IN A POPULATION-BASED COHORT Maria E. Garcia¹; Anne Lee¹; Hector Gonzalez²; Tu My To¹; Mary N. Haan¹. ¹University of California, San Francisco, San Francisco, CA; ²Michigan State University, East Lansing, MI. (Tracking ID #2195208)

BACKGROUND: Compared to non-Hispanic Whites, older Latinos are disproportionately affected by depression and diabetes. Both diabetes and depression are associated with poorer health outcomes, yet there have been few longitudinal studies of comorbid depression and diabetes among Latinos. The purpose of this study was to determine whether having a diabetes diagnosis increased the incidence of poorly controlled depressive symptoms among older Latinos in a population-based cohort.

METHODS: Study participants were enrolled in the Sacramento Area Latino Study on Aging (SALSA), a population-based cohort ($n=1789$) of Latino individuals aged 60 years-101 years in 1998-99. Diabetes and depressive symptoms were measured during 7 annual home visits to year 2008. Diabetes was defined as self-reported diagnosis, elevated fasting blood sugar and/or use of a diabetic medication. Depressive symptoms were defined as Center for Epidemiological Studies-Depression (CES-D) score ≥ 16 , or use of an anti-depressant drug derived from a medicine cabinet inventory. One thousand two hundred twenty-one individuals were included in the analysis after exclusion of baseline depression cases. There were three possible outcomes: 1) CES-D <16 +no treatment, 2) CES-D ≥ 16 +no treatment, or 3) CES-D <16 or CES-D ≥ 16 +treatment. CES-D <16 +no treatment was the comparison group in multinomial logistic regression models used to examine differences among patients with and without diabetes in incident depressive symptoms. Bivariate analyses identified covariates that were significantly associated with at least one outcome. These included gender, education, and baseline diastolic blood pressure.

RESULTS: There were 374 participants with diabetes at baseline and 449 with incident depression during study follow-up. Of these, only 81 were on an anti-depressant (for presumed treatment of depressive symptoms). Table shows that only the elevated CES-D+ no treatment group is significantly different from the low CES-D and untreated combination in the unadjusted multinomial logistic regression model. Additional adjustment for age, gender, education and diastolic blood pressure influenced the association between diabetes and depressive symptoms only slightly. The risk of elevated depressive symptoms remains highest in diabetics compared to non-diabetics for those with elevated CES-D without treatment. Although the association between diabetes and treated CES-D is not statistically significant, the magnitude of the association is similar to the result for untreated elevated CES-D.

CONCLUSIONS: In a population-based study of older Latinos, we found a modest but robust association between diabetes and the incidence of poorly-controlled depressive symptoms. Treatment with an anti-depressant was rare and did not influence associations. This study suggests the need to increase screening and treatment of depression among older Latinos diagnosed with diabetes.

Multinomial logistic regression of association between diabetes and incident depressive symptoms

Category	N	Unadjusted	Adjusted for all covariates
		OR (95 % CI)	OR (95 % CI)
CES-D <16 , no treatment	772	1.0	1.0
CES-D ≥ 16 , no treatment	368	1.32 (1.01–1.73)	1.34 (1.01–1.76)
CES-D <16 or CES-D ≥ 16 , treated with anti-depressant	81	1.26 (0.77–2.04)	1.24 (0.75–2.04)
-2 log likelihood		2025.6	1879.0
Chi square:		146.6	

DIABETES RISK AND MEDIATORS AMONG REFUGEES AND IMMIGRANTS: A LONGITUDINAL ANALYSIS Seth A. Berkowitz¹; Gabriel E. Fabreau⁴; Sridharan Raghavan²; Katherine Kentoffio⁵; Wei He¹; Steven J. Atlas²; Sanja Percac-Lima³. ¹MGH, Boston, MA; ²Massachusetts General Hospital, Boston, MA; ³Massachusetts General Hospital, Chelsea, MA; ⁴University of Calgary, Calgary, AB, Canada; ⁵Harvard Medical School, Boston, MA. (Tracking ID #2191910)

BACKGROUND: How diabetes risk for refugees and immigrants compares with that of American-born patients living in the same communities is unclear, but has important implications for diabetes prevention efforts. Better understanding of mechanisms that may mediate diabetes risk would further enhance these efforts.

METHODS: We constructed a longitudinal cohort of patients aged ≥ 18 years who came to the US as refugees. These patients were matched in a 1:3 ratio by age, gender, and date of initiation of care to 1) Spanish-speaking non-refugee immigrants, and 2) US born, English-speaking controls. All patients received primary care in the same community health center, which is a state refugee clinic and serves a low-income, ethnically diverse community in Eastern Massachusetts. Using data from an electronic repository, patients were followed longitudinally for development of diabetes, determined with a validated algorithm. We also abstracted age at cohort entry, gender, educational attainment ($<$ vs. \geq high school diploma), insurance type, median household income at the census tract level, and baseline body mass index (BMI). We used Cox regression to estimate the risk of incident diabetes for refugees and immigrants compared with controls. We also tested whether differences in educational attainment or baseline obesity ($\text{BMI} > 30 \text{ kg/m}^2$) mediate diabetes risk, using counterfactual mediation analysis. Finally, because there may be differences in reproductive patterns between groups, which could influence diabetes risk, we tested whether number of pregnancies mediated diabetes risk in women.

RESULTS: We included 3174 patients in our study. Patients with diabetes at baseline, including 2.5 % (15/604) of refugees, 6.0 % (79/1310) of immigrants, and 4.1 % (51/1260) of control patients ($p=0.001$), were excluded from analyses of incident diabetes risk. Among refugee patients, the most common countries of origin were Somalia (17.8 %), Iraq (16.7 %) and Bhutan (8.8 %). Of refugees and immigrants, 41.5 %, and 55.6 %, respectively, had $<$ high school diploma educational attainment, compared with 11.0 % of controls ($p<0.001$). Mean (SD) baseline BMI was 26.4 (5.8), 29.1 (5.7), and 29.2 (7.3) kg/m^2 , for refugees, immigrants, and controls, respectively. Over a median follow-up of 3.7 years (interquartile range 1.3–7.4 years), 7.0 % of refugees, 8.3 % of immigrants, and 6.0 % of controls developed diabetes. In unadjusted Cox regression models, both refugee (Hazard Ratio [HR] 1.59, 95 % Confidence Interval [95%CI] 1.08–2.35) and immigrant (HR 1.60 95%CI 1.18–2.17) statuses were associated with increased diabetes risk compared with controls. In Cox models adjusted for the above covariates, both refugee (HR 2.08 95%CI 1.32–3.29) and immigrant (HR 1.52 95%CI 1.02–2.27) statuses remained associated with increased diabetes risk compared with controls. The difference in risk between refugees and immigrants, in adjusted models, was not statistically significant (HR for refugees 1.37 95%CI 0.91–2.06). In mediation analyses, educational attainment mediated 36 % ($p=0.007$) of the difference in diabetes risk between refugees/immigrants and controls. By contrast, baseline obesity did not mediate difference in diabetes risk (proportion mediated 1 %, $p=0.84$). In women, number of pregnancies did not mediate diabetes risk (proportion mediated 0 %, $p=0.99$).

CONCLUSIONS: Refugees and immigrants in this study had significantly increased risk for developing diabetes compared with age and gender matched controls from the same community. This risk was mediated by differences in education. Adult education programs, or education-based lifestyle interventions to reduce diabetes incidence, such as the Diabetes Prevention Program curriculum adapted for the specific needs of refugees and immigrants, may be a promising strategy to improve health for these vulnerable patients.

DIAGNOSTIC CARDIAC FELLOWS: DO THEY INCREASE RADIATION EXPOSURE AND PROCEDURAL TIMES Ankita Sharma; Ramsey Joudeh; Molly Perini; George Fernaine. Lutheran Medical Center, Bayside, NY. (Tracking ID #2194758)

BACKGROUND: Prior studies have shown increased radiation exposure on diagnostic cardiac procedures performed by cardiology fellows. We sought to quantify and compare radiation exposure parameters during cardiac catheterization (CC) procedures performed by fellows and attendings in a community hospital without surgical backup.

METHODS: We retrospectively reviewed medical records of 661 patients who underwent cardiac catheterization from January 2012 to February 2013. Fluoroscopy time, total kerma area product (KAP), cumulative dose area product (DAP) and diagnostic start and end times were compared between second and third-year fellows and attendings. Mean differences in exposure parameters were compared using independent t-tests.

RESULTS: The attendings had lower exposure parameters except in mean fluoroscopy time. The mean total kerma area product and cumulative DAP were found to be statistically significantly different when comparing fellows to attendings. Table 1 contains the results of the independent samples t-tests.

CONCLUSIONS: There was no statistically significant difference in procedural times between fellows and attendings. However, we found a significant increase in total kerma area product (KAP) and cumulative dose area product (DAP) during a cardiac catheterization procedure performed by a diagnostic fellow. Concordant with current literature, the participation of diagnostic fellows during CC procedures adds additional risk of radiation exposure to the patient.

Independent Samples T-Test

	Number of Patients	Mean \pm Std. Deviation	P
Fluoroscopy Time (minutes)	661		0.204
Fellow	330	7.07 \pm 5.056	
Attending	331	7.65 \pm 6.623	
Total Kerma Area Product (Gy)	661		0.003
Fellow	330	1.93 \pm 2.175	
Attending	331	1.48 \pm 1.647	
Cumulative DAP (Gy.Cm2)	661		0.002
Fellow	330	125.62 \pm 153.319	
Attending	331	92.07 \pm 117.042	
Procedural Time (minutes)	661		0.108
Fellow	330	36.95 \pm 27.458	
Attending	331	33.48 \pm 27.995	

DIAGNOSTIC PITFALLS: A NEW CONCEPTUAL APPROACH TO UNDERSTAND DIAGNOSTIC ERROR Gordon D. Schiff^{1, 2}; Mayya Volodarskaya¹; Harry Reyes Nieva^{1, 2}; Hardeep Singh^{3, 4}; Adam Wright^{1, 2}. ¹Brigham and Women's Hospital, Boston, MA; ²Harvard Medical School, Boston, MA; ³Houston Veterans Affairs Health Services, Houston, TX; ⁴Baylor College of Medicine, Houston, TX. (Tracking ID #2199986)

BACKGROUND: Studies have shown that diagnostic errors (DEs) are a leading patient safety problem, particularly in primary care settings, yet progress in understanding and preventing such errors has been modest. While debate exists over definitions of DEs and the extent to which they are rooted in cognitive vs. system failures, most agree they are multi-factorial and require fresh approaches. We systematically reviewed multiple data sources to develop a new conceptual approach to understand DEs by delineating their respective high-risk clinical circumstances.

METHODS: We used a mixed-methods approach to develop a new construct—"diagnostic pitfalls"—which we define as specific clinical situations where there are patterns of, or vulnerabilities to, errors that lead to missed, delayed or wrong diagnosis. We conducted a multi-pronged search using the following data sources: a) systematic literature review (using the search terms *diagnosis*, *error*, *pitfall* and *primary care*) with a predefined snowball strategy to identify additional relevant literature; b) AHRQ Web M&M (Morbidity and Mortality Rounds) cases/discussions from 2003 to 2014; c) Institutional ambulatory M&Ms of a large integrated academic network from 2006 to 2014; d) Institutional risk management patient safety event reports from 2010 to 2014 coded as diagnosis/treatment related. For each relevant case identified in the literature or via local quality/safety databases, we extracted the diagnoses (correct and erroneous) and presenting signs and symptoms. Breakdown(s) in diagnostic process were classified using two previously published taxonomies, Diagnosis Error Evaluation and Research (DEER) and Timely and Reliable Diagnosis Challenges (TARDC). From this compilation, we identified disease-specific clinical challenges and used the emerging themes to derive specific diagnostic pitfalls and concepts.

RESULTS: From 106 articles, 81 Web M&Ms, 24 institutional network ambulatory M&Ms and 1005 diagnosis/treatment risk management reports, we identified 195 disease-specific pitfalls across 127 unique diseases/diagnoses. Common missed/delayed diagnoses included cancers, cerebral hemorrhage, and pulmonary embolism; the most frequent presenting symptoms were pain, fever and emesis. Using the DEER taxonomy we identified failure/delay in considering the diagnosis ($n=34$), failure/delay in ordering needed tests ($n=25$) and failure/delay in eliciting critical history information ($n=16$) as the most frequent problematic steps in the diagnostic process. The TARDC classification system highlighted consistent issues with the performance/interpretation of laboratory tests ($n=29$), challenges related to non-specific symptoms and signs ($n=20$) and failure to diagnose underlying cause ($n=19$). A number of generic diagnostic pitfall paradigms emerged including: a) disease A repeatedly mistaken/misdiagnosed for disease B (e.g. colon cancer mistaken for celiac disease); b) failure to appreciate the limitations of a test or exam; c) atypical presentation; d) chronic disease assumed to account for a symptom rather than suspecting new diagnosis; e) failure to monitor evolving symptom.

CONCLUSIONS: "Diagnostic pitfalls" represent a new and useful construct to engage the interface between system and cognitive failure modes in diagnosis. We were able to identify and classify such pitfalls from published and locally reported cases. Recurring patterns of diagnostic pitfalls were seen that illustrate both generic and disease-specific

types of errors. Identifying such pitfalls offers potential advantages for understanding, preventing, and increasing awareness of diagnostic errors in medicine.

DIFFERENCES IN NURSING HOME QUALITY BETWEEN MEDICARE ADVANTAGE AND TRADITIONAL MEDICARE PATIENTS Emily Chang¹; Teague Ruder²; Claude Setodji²; Debra Saliba^{5, 3}; Mark Hanson³; David Zingmond¹; Neil Wenger^{1, 3}; David Ganz^{4, 1}. ¹UCLA, Los Angeles, CA; ²RAND, Pittsburgh, PA; ³RAND, Santa Monica, CA; ⁴VA GRECC, Los Angeles, CA; ⁵UCLA Borun Center, VA GRECC, Los Angeles, CA. (Tracking ID #2199859)

BACKGROUND: Medicare Advantage (MA) enrollment is steadily growing, but little is known about the quality of nursing home (NH) care provided to MA enrollees compared to enrollees in traditional fee-for-service (FFS) Medicare. Our study objective is to compare MA and FFS enrollees' quality of NH care.

METHODS: We conducted a cross-sectional study of 2.17 million Medicare enrollees receiving care at a U.S. nursing home during 2011. Medicare enrollment file extracts provided by the Centers for Medicare & Medicaid Services (CMS) were merged with data from the quarterly 2011 Long-Term Care Minimum Data Set 3.0. CMS methodology was used to calculate the 18 Nursing Home Compare quality measures as applicable for each enrollee. We then calculated the relative risks (RR) of complication/adverse outcome/quality measures between MA versus FFS enrollment, using four different regression models predicting complication (or quality of care) that progressively adjusted for increasing numbers of characteristics.

RESULTS: Among Medicare enrollees in 2011, 17 % were in MA plans. Most NH quality measure scores were similar between MA and FFS Medicare enrollees. Relative risks (RR) for MA versus FFS enrollment for the NH quality measures were unchanged when progressively adjusted for facility, beneficiary age and gender, CMS Hierarchical Condition Category score, and geographic region. Short-stay MA patients had lower rates of pressure ulcers (RR=0.76) and new antipsychotic use (RR=0.82) but higher rates of moderate to severe pain (RR=1.09). MA long-stay patients also had lower rates of antipsychotic use (RR=0.94) but had higher rates of incontinence (RR=1.08) and urinary catheterization (RR=1.10).

CONCLUSIONS: Overall, we found few differences in NH quality scores between MA and FFS Medicare enrollees. MA enrollment was associated with better scores for pressure ulcers and antipsychotic receipt but worse scores for pain control, incontinence, and urinary catheterization. Results may be limited by residual case-mix differences between MA and FFS patients or by the small number of short-stay measures reported. Future studies may be able to better distinguish NH quality performance between MA patients and FFS by including MA encounter data to improve matching between MA and FFS patients, when such data becomes generally available.

DIVISION OF LABOR IN PRIMARY CARE MANAGEMENT AMONG FEDERALLY QUALIFIED HEALTH CENTERS, 2009–2013 Jamie Ryan; Samantha Mackie; Maureen Deboo. The Commonwealth Fund, New York, NY. (Tracking ID #2198583)

BACKGROUND: Federally Qualified Health Centers (FQHCs) are community-based clinics that provide comprehensive primary care and behavioral and mental health services regardless of patients' ability to pay. There is much debate surrounding how the implementation of the Affordable Care Act (ACA) is affecting these health centers' ability to accommodate increased demand. One strategy to continue to provide quality care to a growing patient population without dramatically increasing costs is to better utilize non-physician clinicians in primary care. This analysis examines staffing patterns among various provider types working in FQHCs from 2009 to 2013.

METHODS: Data come from the 2009 and 2013 Commonwealth Fund Surveys of Federally Qualified Health Centers that were conducted among a nationally representative sample of FQHCs. The 2009 survey was completed by mail, online or by phone by 795 FQHCs (response rate of 79 %), March-May 2009; the 2013 survey was completed by mail or online by 679 FQHCs (response rate of 60 %), June-October 2013. We examine the division of labor among physicians, advanced practice providers (including nurse practitioners and physician assistants), registered nurses, and other clinical staff (e.g., medical assistants) working in FQHCs in regards to the following typical primary care management tasks: calling patients to check on medications, symptoms, or to help coordinate care between visits; executing standing orders for medication refills or ordering tests; educating patients about managing their own care; and coordinating care with providers outside the health center.

RESULTS: Health centers reported that physicians and advanced practice providers educated patients, executed standing orders for medication refills and tests, and coordinated care with outside providers at similar rates in both 2009 and 2013. All staff types were utilized more in 2013 than in 2009 for all four tasks we examined. While the increase

from 2009 to 2013 in the use of other clinical staff has outpaced that of physicians, advanced practice providers, and registered nurses with the tasks of calling patients between visits (52 % in 2009 to 76 % in 2013) and educating patients (50 to 77 %), the opposite was true for executing standing orders for medication refills or tests and coordinating care with outside providers. A greater percentage of centers reported that nurses (77 %) and other clinical staff (77 %) were involved in coordinating care with outside providers than physicians (57 %) and advanced practice providers (58 %). However, the percentage of physicians and advanced practice providers coordinating care increased more from 2009 to 2013 than that of registered nurses and other clinical staff. The number of centers reporting physician and advanced practice provider involvement in coordinating care with outside providers increased by 68 and 57 % respectively, compared to a 22 % increase for nurses and a 24 % increase for clinical staff. Additionally, the percentage of centers reporting physician and advanced practice provider involvement in patient education has increased from three-quarters in 2009 to 93 % in 2013.

CONCLUSIONS: Many health centers are already utilizing physicians and advanced practice providers in similar ways. However, there is potential to increase the use of registered nurses and other clinical staff such as medical assistants in educating patients about care management, calling patients to check on medications or symptoms, and coordinating care between visits and with external providers. However, to function efficiently and be responsive to patients' needs, care teams need to divide tasks logically. Physicians could ease off of tasks that can be completed by other clinical staff, such as coordinating care with outside providers and executing standing orders for refills and tests, to free up more time for face-to-face patient care. It is clear that increasing clinical staff would result in improved timeliness and access to health services. A practical way to increase the clinical staff available for primary care and non-complex chronic disease management without drastically increasing operating costs is to allow non-physician clinicians to practice to the full extent of their training and education. The wide variation among states' scope of practice laws limits the ability of the federal government to make staffing recommendations or scale up innovative care models such as nurse-led medical homes. Prior studies have shown that physicians agree that nurses should be able to practice to the full extent of their licenses. A national standard regarding scopes of practice could revitalize the organization of care and chronic disease management in this country.

DO EARLY PHASE DNR ORDERS APPROPRIATELY WORK FOR EMERGENTLY ADMITTED PATIENTS? Seiji Bito¹; Tomoari Mori². ¹NHO Tokyo Medical Center, Tokyo, Japan; ²The University of Tokyo, Setagaya, Japan. (Tracking ID #2193695)

BACKGROUND: Discussions about resuscitation are often harmful for emergency patients and their family. "Do not resuscitate (DNR) orders", however, are enforced immediately after hospitalization in reality. We investigated associations between patient factors and early phase DNR orders after admissions. We also investigated if early DNR orders predict patients' death as accurate as those at a later date.

METHODS: We conducted secondary data analysis using a dataset extracted from electrical medical records saved from January, 2009 to December, 2012 in an educational hospital. We sampled patients who were hospitalized as emergency admissions and stayed more than 3 days. Those who had cancer, who received surgical services, and who admitted with cardiopulmonary arrests were excluded from the analysis. We identified "early DNR orders" as those are forced on the same or the following day of the hospitalizations. We compared associations between patients' characteristics and early DNR orders first. Then we compared death rates between those with early DNR orders and those with later DNR orders.

RESULTS: Twelve thousand seven hundred fifty emergency patients' data were included in the analysis. Eleven percent of the patients were forced DNR orders and 52 % of them had early DNR orders. Only 1 % were changed their resuscitation status on discharge. While early DNR orders were examined to only 1 % of the patients under 75 years old and 5 % of those from 75 to 84 years old, 17 % of the patients 85 years old or over had early DNR orders. Logistic regression analysis showed that higher age group, cardiac diseases and neurologic diseases had significant associations with early DNR orders (OR 3.6 [95% C.I. 3.3–3.8], OR 0.5 [95% C.I. 0.4–0.6], OR 0.5 [95% C.I. 0.3–0.7], respectively). While 54 % of the patients with later DNR orders died in the hospitalization period, 28 % of those with early DNR orders died.

CONCLUSIONS: Age was a major determinant factor of early DNR orders. Early DNR orders can't accurately predict looming patients' death. Health care staff should prudently about decisions of DNR in very early phase on admissions.

DO INTERNAL MEDICINE RESIDENTS PERFORM PATIENT CENTERED MEDICAL HOME EPAS? A MIXED-METHODS STUDY Lauren Block; Nancy A. LaVine; Jennifer Verbsky; Joseph Conigliaro; Saima Chaudhry. North Shore-LIJ Health System, Lake Success, NY. (Tracking ID #2200037)

BACKGROUND: Increasingly, residents are being trained in NCQA-certified Patient Centered Medical Homes (PCMH). The Society of General Internal Medicine has defined a set of 25 PCMH Entrustable Professional Activities (EPAs) for residents. It is unknown how frequently residents are engaging in these EPAs. We sought to understand whether residents assigned to PCMH sites reported higher likelihood of engaging in EPAs than those assigned to non-PCMH sites. To improve our understanding of the facilitators and barriers to patient-centered care, we included a qualitative analysis of resident, faculty, and staff perceptions at one PCMH and one non-PCMH site.

METHODS: This was a mixed-methods study incorporating resident survey data and nominal group data from residents, faculty, and staff. Internal medicine residents at three residency programs encompassing eight ambulatory clinic sites in New York were included. At two of these programs, residents had been assigned to either a PCMH or ambulatory clinic site upon entering the program. Non-PCMH sites included a hospital-based clinic, VA, university-owned GIM practice, and private practices. The primary outcome was resident-reported performance of PCMH EPAs. Secondary outcomes included self reported learning and teaching, inter-professional collaboration, and satisfaction with clinic. The survey was conducted electronically and a nominal group technique was used to elicit qualitative data.

RESULTS: A total of 179 residents responded to the survey for an overall response rate of 80 %. Fifty two percent of residents saw patients in PCMH sites. There was no difference in year in residency or gender between residents that worked at PCMH and non-PCMH sites. Residents at PCMH sites were more likely to report engaging in EPAs in four of six NCQA domains. These included enhancing access and continuity (using phone and electronic health record accessed remotely, accommodating care for patient with language and cultural barriers), identifying and managing patient populations (intervening for patients with high risk medications, chronic diseases, and substance abuse), planning and managing care (using EMR, using guidelines, performing medication reconciliation), and providing self-care and community support (counseling patients on self management and health behaviors, using community resources). Residents at PCMH sites were not more likely to report tracking and coordinating care (helping patients transition, help patients attend visits) or measuring and improving performance (engaging in quality improvement, accessing clinic performance data) compared to residents at non-PCMH sites. Residents at PCMH sites were more likely to report working with NPs and medical assistants, but not other healthcare professionals. There were no differences in satisfaction with the ambulatory experience or in ratings on teaching, learning, or staff collaboration scales between PCMH and non-PCMH sites. From qualitative data, residents, faculty, and staff at both sites reported staff teamwork and continuity of care as facilitators of patient-centered care, and technological problems and office inefficiencies as barriers to care.

CONCLUSIONS: An increasing number of residents are training in PCMH sites. Residents at PCMH sites were more likely to engage in EPAs in several NCQA domains, but there is room for improvement in care coordination and quality assessment. Residents at PCMH sites were more likely to work with NPs and medical assistants but reported working with other professionals infrequently even though these professionals worked at the PCMH sites. This signals an opportunity to expand collaboration, define roles of the multi-disciplinary team, and implement workflows to promote communication. One potential reason residents do not engage in all aspects of patient-centered care may be limited insight into the functioning of the PCMH or awareness of PCMH principles. Qualitative data confirmed that continuity and teamwork were goals at all sites and that technological and office efficiency problems hindered provision of patient-centered care, signaling an opportunity to improve communication in resident practices.

DO KNOWLEDGE GAINS TRANSLATE INTO BEHAVIOR CHANGE? PAIRING PHYSICIAN-DIRECTED AND POINT-OF-CARE PATIENT EDUCATION STRATEGIES TO INCREASE COLORECTAL CANCER KNOWLEDGE AND SCREENING COMPLETION Kenzie A. Cameron²; Vanessa Ramirez-Zohfeld²; Nancy C. Dolan²; M. Rosario Ferreira²; Jonathan M. Radosta³; William L. Galanter⁴; Milton "Mickey" Eder¹; Michael S. Wolf²; Dachao Liu²; Alfred Rademaker². ¹Access Community Health Network, Minneapolis, MN; ²Northwestern University, Chicago, IL; ³University of Illinois Hospital and Health Sciences System, Chicago, IL; ⁴University of Illinois at Chicago, Chicago, IL. (Tracking ID #2199043)

BACKGROUND: Colorectal cancer (CRC) remains a leading cause of death in the United States; yet screening rates remain suboptimal. Most interventions to increase CRC screening target either physicians or patients, with limited success. We implemented both physician-only and combined physician-patient strategies and assessed their effectiveness on (1) patient knowledge related to CRC and CRC screening completion, (2) physician recommendation of screening, and (3) patient CRC completion. The physician strategy (MD) involved multiple physician training sessions and continuous quality improvement feedback; patients in the combined physician-patient (MD+DVD) strategy arm were also shown a patient education DVD.

METHODS: We conducted a three-arm quasi-experimental design [MD, MD+DVD, usual care (UC)] among patients at eight health centers in an urban area. Participants were English- or Spanish-speaking, age 50–75, who were not up to date with CRC screening. Clinics were allocated to receipt of physician intervention; patients at intervention clinics were randomized to the DVD. Knowledge was measured via face-to-face interviews at baseline (immediately prior to MD visit) and at post-test (immediately following MD visit) using 8 items. Differences in knowledge change (post-test - pre-test) among arms and across literacy levels were assessed using linear model analysis accounting for health center differences. Bonferroni corrected post hoc analyses were conducted with $p < 0.017$. Physician screening recommendation and patient completion of CRC screening were calculated using a risk ratio; screening recommendation and screening completion comparisons between control and intervention groups were also adjusted for clustering by clinic, analyses among the two intervention (MD, MD+DVD) arms for screening completion were adjusted for stratification by clinic and age.

RESULTS: Among 538 participants, the mean age was 57.8 (SD=6.2); 73.8 % female; 42.9 % Hispanic/Latino and 53.2 % Non-Hispanic Black; 29.7 % reported being uninsured. Among the 437 participants for whom we had complete knowledge data, mean knowledge change (increase) was 1.63 (SEM=0.09), 0.54 (SEM=0.09), and 0.17 (SEM=0.10) among the MD+DVD, MD, and UC, respectively. Knowledge change was significant for MD+DVD and MD ($p < 0.0001$). There was no effect of literacy on knowledge change for any of the arms. Knowledge change among participants in the MD+DVD arm was significantly higher than in the MD or UC arms ($p < 0.0001$), with the MD arm significantly higher than the UC arm ($p = 0.007$). Among the full sample ($n = 538$), there was no significant difference among physician recommendation of CRC screening in the control (42.9 %) versus combined intervention groups (57.6 %; Risk ratio (RR)=1.43, $p = 0.42$, 95 % CI: 0.60–3.43); due in large part to the large interclass correlation coefficient (ICC)=0.295. Results also indicated no significant effect between UC and intervention groups for CRC screening completion (RR=1.65, $p = 0.32$, 95%CI: 0.62–4.38, ICC=0.081), nor between MD and MD+DVD arms (RR=0.80, $p = 0.28$, 95%CI: 0.53–1.20).

CONCLUSIONS: Providing patients a point-of-care educational DVD on CRC and CRC screening resulted in the greatest amount of knowledge change. However, even with the provision of such foundational information, and resultant increase in patient knowledge, no comparable difference was seen in physician recommendation nor patient CRC screening completion. These results suggest that to improve CRC screening among this underserved population, there is a critical need for involvement across multiple levels of patient care—with complementary and reinforcing messages, comprehensive interventions, and system redesign to reach the patient, the physician, the clinic, and the system.

DO PRESCRIBED OPIOIDS IMPACT CD4 COUNT RESTORATION AMONG HIV+ PATIENTS INITIATING ANTIRETROVIRAL THERAPY? E. J. Edelman¹; Janet P. Tate¹; Kirsha S. Gordon¹; William Becker²; Kendall Bryant³; Kristina Crothers⁴; J. R. Gaither⁵; Cynthia Gibert⁶; Adam Gordon⁷; Brandon D. Marshall⁸; Maria Rodriguez-Barradas⁹; Jeffrey H. Samet¹⁰; Melissa Skanderson⁷; Amy C. Justice^{1,2}; David

A. Fiellin¹. ¹Yale University School of Medicine, New Haven, CT; ²VA Connecticut Healthcare System, West Haven, CT; ³National Institutes of Health (NIH), Bethesda, MD; ⁴University of Washington, Seattle, WA; ⁵Yale University, New Haven, CT; ⁶DC VAMC and George Washington University, Washington, DC; ⁷University of Pittsburgh and VA Pittsburgh Healthcare System, Pittsburgh, PA; ⁸Brown University, Providence, RI; ⁹Michael E. DeBakey VAMC and Baylor College of Medicine, Houston, TX; ¹⁰Boston University School of Medicine, Boston, MA. (Tracking ID #2199293)

BACKGROUND: As some opioids are immunosuppressive, we sought to determine the effect of prescribed opioids on CD4 count restoration among HIV+ patients initiating antiretroviral therapy (ART).

METHODS: HIV+ patients from the Veterans Aging Cohort Study initiating ART between 2002 and 2012 were included and followed for 2 years. We excluded those who lacked a CD4 count or had an undetectable viral load at ART initiation. Using pharmacy data, prescribed opioid exposure was categorized as none, short-term (<90 days), and long-term (≥90 days). CD4 counts were repeatedly measured and used in a mixed model to assess the unadjusted and adjusted association between prescribed opioid exposure and CD4 count (square root transformation) over time. Covariates included age, race/ethnicity, hepatitis C status, diabetes mellitus, substance use disorder, smoking status, major depression, pain diagnoses, protease inhibitor vs. NNRTI-based regimen, year of ART initiation (2002–2004, 2005–2007, 2008–2010), months on ART, and interaction terms for opioid exposure and months on ART. We also stratified analyses by baseline CD4 count (<200, 200–349, 350–499, ≥500 cells/mm³).

RESULTS: Among 4352 HIV+ eligible participants, the mean age was 48 years; 97 % were men; and the sample was racially/ethnically diverse (white 33 %, black 55 %, hispanic 6 %, other 5 %). Prescribed opioid exposure was common: 36 % short-term and 12 % long-term. CD4 count at baseline and at 24 months was lowest among those with short-term prescribed opioid exposure (Figure). In both the unadjusted and adjusted analyses, compared to none, those with short-term prescribed opioid exposure had a statistically non-significant slower rise in CD4 count; those with long-term prescribed opioid exposure had a similar rise in CD4 count compared to those with no prescribed opioid exposure (Table). In the stratified analysis, among those with a baseline CD4 count >500 cells/mm³, compared to none (increase per year: 53 cells/mm³), those with short-term prescribed opioid exposure had a statistically significant slower rise in CD4 count (increase per year: 21 cells/mm³, $p = 0.04$); those with long-term prescribed opioid exposure had a similar rise (increase per year: 51 cells/mm³, $p = 0.93$). Results were otherwise unchanged.

CONCLUSIONS: Among HIV-infected patients initiating ART, short-term prescribed opioid exposure may have mild effects on CD4 count restoration, especially among those with CD4 counts ≥500 cells/mm³. Future studies will examine whether these effects vary based on dose and prescribed opioid type.

Table. Association between Prescribed Opioids and Predicted CD4 Count, Mixed Models ($n = 4358$)

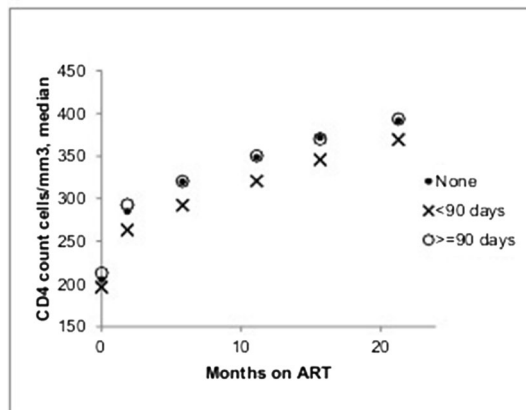
Prescribed Opioid Exposure	Unadjusted	Adjusted						
	CD4 at baseline, cells/mm ³	CD4 at 24 months, cells/mm ³	Increase per year, cells/mm ³	p value	CD4 at baseline, cells/mm ³	CD4 at 24 months, cells/mm ³	Increase per year, cells/mm ³	p value
None (ref)	229	373	72	–	247	397	75	–
Short-Term <90 days	215	345	65	0.10	231	365	67	0.10
Long-Term ≥90 days	235	381	73	0.98	245	393	74	0.98

DOCTORS DON'T DIE DIFFERENTLY: DOCTORS USE OF HIGH COST LOW VALUE CARE AT END OF LIFE NO DIFFERENT FROM NON-DOCTORS Stacy M. Fischer³; Sung-joon Min³; Alexander K. Smith¹; Amy Kelley⁴; Traci E. Yamashita²; Daniel Matlock². ¹University of California, San Francisco, San Francisco, CA; ²University of Colorado, Aurora, CO; ³University of Colorado School of Medicine, Aurora, CO; ⁴Mount Sinai School of Medicine, New York, NY. (Tracking ID #2196860)

BACKGROUND: The prevailing view of the main stream media and a large body of hypothetical physician survey data suggest that physicians prefer a less invasive, more comfort-based approach to their care when facing life limiting illness. There have been no

studies to our knowledge comparing actual utilization at the end of life between physicians and non-physicians. We aimed to compare health care utilization in the last months of life between physicians and non-physicians. We hypothesize that physicians use fewer high cost, low value resources at the end of life compared to non-physician decedents.

METHODS: This is a retrospective observational cohort study. Using Medicare Part A claims data from 2009 and 2010 for decedent physicians (identified by American Medical Association's file of deceased physicians matched to their Medicare claims data, $n = 9947$) and a random sample of Medicare decedents ($n = 192006$), we compared health care utilization in the last months of life. Using logistic and linear regression modeling, we adjusted for sociodemographic characteristics and regional variations in health care. Sociodemographic information available from the Medicare claims includes birth date,

Figure. Observed CD4 Count Trajectory by Prescribed Opioid Exposure

sex, race/ethnicity, and annual household income calculated based on 2010 U.S. Census zip code data. We adjusted for comorbidity using the modified Charlson comorbidity index based on diagnoses in the Medicare claims during the final 6 months of life. To account for regional variations in health care at the end of life, we linked decedents to their hospital referral region (HRR) using zip code. For each HRR, we included a measure of supply: the number of acute care hospital beds per 1000 residents in 2006 and a measure of practice: the hospital care intensity (HCI) index in 2010. The HCI is a standardized regional composite measure that incorporates the numbers of days patients spend in the hospital and the number of physician encounters during the hospitalization measured as a ratio compared to the national average. Differences between physicians and non-physicians stratified by age group (<75, 85+ vs. 75 to 84), and age group by cohort (physician vs. non-physician) interaction in the regression models were examined for the hospital and hospice utilization to determine if the differences were consistent across age groups. Differences between medical subspecialties were also investigated by comparing one group with all other subspecialty fields. Significance was defined as $P < 0.05$ (or 95 % confidence).

RESULTS: Physician and non-physician decedents had a mean age of 82 years. Physicians were more likely to be Caucasian (92 % v 88 %) and male (94 % v 44 %). After adjusting for sociodemographic characteristics and regional variations in health care, we found both inpatient hospital and hospice utilization in the last 6 months of life remained nearly identical between physicians versus non-physicians: 1) Physician likelihood of utilizing the hospital (OR=0.98 CI 0.93–1.04); 2) Difference in mean hospital days (beta=0.14, $p=0.3$); 3) Physician likelihood of dying in the hospital (OR=0.99 CI 0.95–1.04) 5) Difference in mean ICU/CCU days (0.18, $p < 0.0001$); 6) Proportion using hospice (OR=1.23 CI 1.18–1.29); 7) Difference in mean number of days in hospice (2.06 $p < 0.0001$). We did not find meaningful differences between physicians and non-physicians when we looked at the same utilization measures in the last month of life. After stratifying by age and adjusting for covariates, the difference between physicians and non-physicians was not significantly different in 65–74 or 75–84 age categories, compared to the 85+ category (table). Utilization between medical subspecialties for hospital and hospice utilization was very similar. Compared to all other specialty fields, psychiatry appeared to have the lowest hospice use (39 % vs. 47 %, $P < 0.001$) and adult medical subspecialty appeared to have higher hospital use (13.9 vs. 12.3 mean number of days, $P=0.04$).

CONCLUSIONS: In contrast to the prevailing view of the main stream media and a large body of hypothetical physician survey data, physicians and non-physicians have very similar health care utilization at the end of life. Doctors do not die any “better” than non-doctors.

Utilization of hospital and hospice in the last 6 months of life, adjusted and stratified by age

Mean Days in Hospital (±SD)			
Age at death	Physicians (n=9914)	Non-Physicians (191,419)	p value
65–74	14.8 (±23.4)	15.4 (±21.6)	0.31
75–84	13.5 (±19.6)	14.0 (±19.0)	0.16
85+	10.0 (±15.2)	9.5 (±13.8)	0.04
Percentage utilizing hospice during last 6 months of life			
Age at death	Physicians (n=9947)	Non-Physicians (n=191,980)	p value
65–74	34.6 %	35.8 %	0.30
75–84	44.6 %	42.4 %	0.01
85+	52.5 %	47.6 %	<0.0001

DOES SOCIAL SUPPORT MODERATE THE ASSOCIATION OF SOCIOECONOMIC STATUS AND SUBCLINICAL ATHEROSCLEROSIS IN THE MULTI ETHNIC STUDY OF ATHEROSCLEROSIS (MESA)? zameer abedin^{1,2}; Ana Diez-Roux³; Kiarri Kershaw²; Anita Panjwani²; Norrina Allen². ¹Texas Tech University Health Science Center, El Paso, TX; ²Northwestern University, Chicago, IL; ³Drexel University, Philadelphia, PA. (Tracking ID #2191922)

BACKGROUND: Cardiovascular disease remains a leading cause of morbidity and mortality in the United States, claiming an estimated 2200 lives each day. Socioeconomic Status, often defined and measured as a person's income and level of education, is associated with the development of subclinical cardiovascular disease. The aim of this study was to determine whether the relationship between SES and subclinical cardiovascular disease differs by an individual's level of social support.

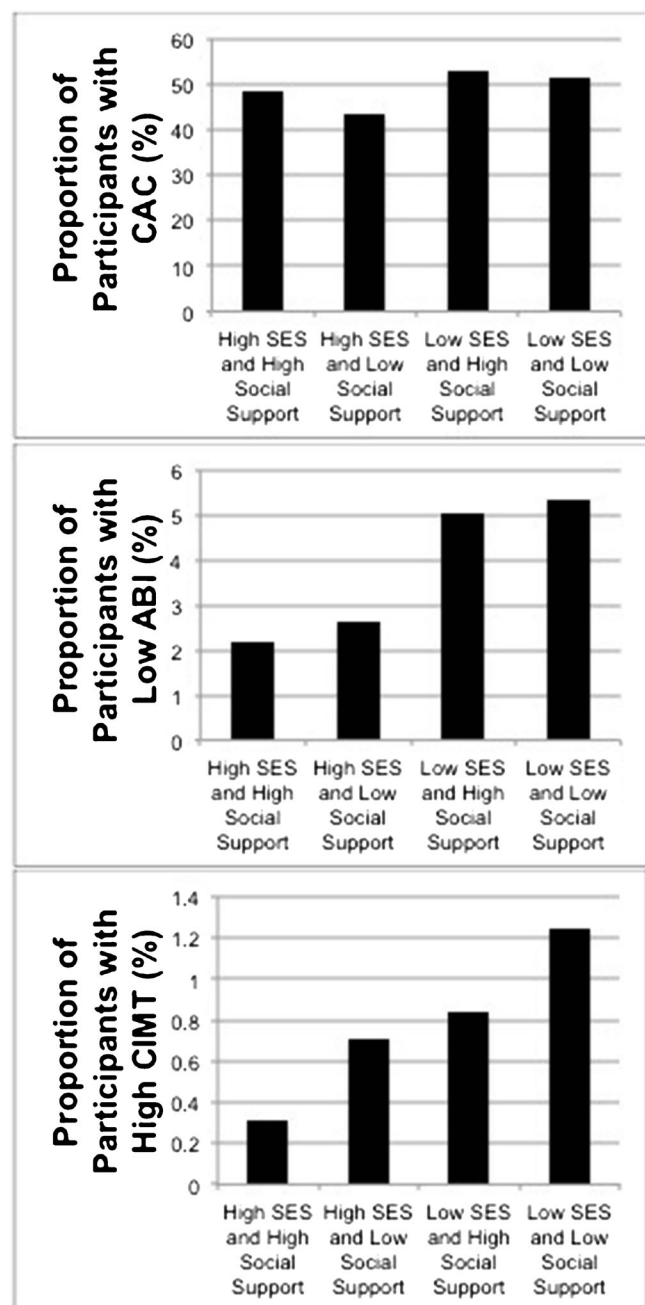
METHODS: This cross-sectional study utilized data on 6517 participants from the Multi-Ethnic Study of Atherosclerosis (MESA) baseline exam (2000–2002). Exposures of interest included social support and SES (calculated using household income and highest level of education). Analyses were conducted using risk-adjusted logistic and Poisson regression models, and primary outcomes measured were coronary artery calcification (CAC), ankle brachial index (ABI), and carotid intima media thickness (CIMT). Models were adjusted sequentially for demographics (age, sex, race/ethnicity), then additionally for CVD risk factors (diabetes, hypertension, hyperlipidemia, obesity, and smoking). Modification of SES by social support was tested using an interaction term, and then by stratifying regression models by participant SES and social support.

RESULTS: Overall, nearly half the sample (49.59 %) exhibited CAC greater than 0, 3.48 % exhibited an ABI below 0.9, and 0.64 % exhibited a CIMT of greater than 1.5 mm. We found that, after adjustment for potential confounders, there was significant interaction between SES and social support for the outcomes of ABI and CIMT ($P=0.008$ and 0.015 , respectively). Participants with low SES and low social support had significantly higher odds of low ABI (OR=1.86 (95 % CI=1.18 to 2.95)) and high CIMT (OR=3.40 (95 % CI=1.27 to 9.14)) as compared to individuals with high SES and high levels of social support.

CONCLUSIONS: For the outcomes of ABI and CIMT, the combination of low socioeconomic status and low social support was associated with the highest risk of subclinical atherosclerosis. Particularly for the outcome of CIMT, the presence of social support may serve to mitigate the effects of low SES, while the effects of SES and social support on ABI appear to be driven largely by SES. The lack of association seen in CAC after adjustment may be a testament to its marked association with demographic factors such as age and race, while ABI and CIMT could conceivably be more highly influenced by social and socioeconomic factors.

Fully Adjusted Odds Ratios for High CAC, Low ABI, and High CIMT (CIMT ≥ 1.5 mm)

	High CAC: Agatston Score >0 [PR (95 % CI)]; N=(%)	Low ABI: ABI ≤ 0.9 [OR (95 % CI)]; N=(%)	High CIMT: CIMT ≥ 1.5 mm [OR (95 % CI)]; N=(%)
High SES and High Social Support	1:Ref N=1420 (48.50)	1:Ref N=63 (2.17)	1:Ref N=9 (0.31)
High SES and Low Social Support	0.95 (0.79–1.13) N=368 (43.35)	1.16 (0.67–2.02) N=22 (2.62)	3.02 (1.05–8.71) N=6 (0.71)
Low SES and High Social Support	0.99 (0.87–1.14) N=1023 (53.14)	1.84 (1.26–2.69) N=96 (5.06)	1.92 (0.77–4.76) N=16 (0.84)
Low SES and Low Social Support	1.03 (0.86–1.22) N=421 (51.66)	1.86 (1.18–2.95) N=43 (5.35)	3.40 (1.27–9.14) N=10 (1.25)



Proportion of MESA Participants With CAC, Low ABI, and High CIMT by SES and Social Support Classification. CAC defined as Agatston Score >0 , Low ABI defined as ABI <0.9 , and High CIMT defined as CIMT >1.5 mm.

DON'T WASTE YOUR BREATH: A STUDY OF INHALER DISPOSAL AT HOSPITAL DISCHARGE FOR COPD PATIENTS WITH ACUTE EXACERBATIONS Joyce Pang¹; Jonah Feldman^{1,2}; Vladimir Liberman¹; Stephanie Mawhirt¹; Farah Daccueil¹. ¹Winthrop University Hospital, Mineola, NY; ²Stony Brook School of Medicine, Stony Brook, NY. (Tracking ID #2198005)

BACKGROUND: Under the current fee-for-service system, no provider or group of providers is accountable for managing the quality and costs of a patient's care throughout the course of treatment. Fee for service payment often promotes fragmented and duplicative care that would be discouraged by other payment methods. Until recently internal medicine trainees have not received any formal training in identifying these types of care inefficiencies. In January 2013, after completing the ACP-AAIM curriculum on High Value Cost Conscious Care, residents in our hospital were asked to identify unrecognized sources of inefficiency or waste, and attempt to calculate the impact of these wasteful

practices. A group of residents, along with a supervising faculty member, identified routine disposal of unfinished MDI inhalers upon hospital discharge as a wasteful practice that warranted further study. This report aims to quantify the impact of this specific practice on patients with COPD exacerbations in a large university hospital.

METHODS: In our 591 bed tertiary referral center we reviewed the medication administration record for all patients hospitalized for COPD exacerbation who had MDI inhalers dispensed during hospitalizations from July to November 2012 ($N=192$). In the hospital's formulary fluticasone propionate/salmeterol came in three dosages, each with 14 inhalations. Budesonide/formoterol came in two dosages each with 60 inhalations. As per hospital protocol all MDI inhalers were disposed at discharge no matter how many dosages remained unused. To calculate the total waste generated by disposal of unfinished inhalers on discharge the number of dispensed doses was subtracted from the total number of inhalations in each medication. This was then multiplied by the cost of each dose as provided by the hospital's pharmacy staff.

RESULTS: For Fluticasone propionate/salmeterol 100/50 mcg, 250/50 mcg, and 500/50 mcg, there were 29, 462, and 144 wasted inhalations respectively. For the first two dosages, the estimated cost was \$7.4/inhalation leading to a total of \$3632.8 wasted. For Fluticasone propionate/salmeterol 500/50 mcg, there were 144 wasted inhalation with an estimated cost of \$12/inhalation leading to a total of \$1728.0 wasted. For Budesonide/formoterol there were a total of 1855 wasted inhalations; with an estimated cost of \$1.9/inhalation leading to \$3486.5 wasted. The total calculated waste during the 5 month study period was \$8847.3. This amounts to a projected waste of \$21,233.5 just for patients admitted for COPD exacerbation over a 12 month period.

CONCLUSIONS: In a fee for service payment system providers are often incentivized to provide duplicative care, but the impact of this inefficiency often goes unrealized until it is formally studied. In our hospital system, we found that a significant amount of resources were being wasted because partially used inhalers were being disposed of on discharge. This represents the first known report to evaluate the financial impact of inhaler disposal, and provides a point of reference for other institutions that currently have similar policies. Based upon these findings, starting in January 2014 our hospital began to provide patients with these unfinished inhalers. This hospital wide change occurred in large part as a result of this resident initiated report. The real world effect of this change on cost and quality remains an important avenue for future study.

DOSE INCREASES FOR PATIENTS STARTING LONG-TERM OPIOID THERAPY FOR PAIN: WHERE AND WHY DO THEY HAPPEN? Christopher A. Bautista¹; Ana-Maria Iosif²; Barth Wilsey^{1,2}; Althea Crichtlow⁴; Joy Melnikov^{4,1}; Stephen G. Henry^{1,4}. ¹University of California Davis, Sacramento, CA; ²VA Northern California Healthcare System, Mather, CA; ³University of California Davis, Davis, CA; ⁴UC Davis Center for Healthcare Policy and Research, Sacramento, CA. (Tracking ID #2197900)

BACKGROUND: Patients on high-dose opioid therapy for chronic pain are at greater risk of opioid-related overdose and death, yet we know little about the circumstances under which physicians increase patients' opioid doses. This study characterized clinical documentation for all opioid prescriptions during patients' first year of long-term opioid therapy and compared clinical documentation for patients with versus without overall opioid dose escalation.

METHODS: We performed a retrospective, nested case-control study using data from the University of California Davis electronic health record for all opioid-naïve adults with musculoskeletal pain who started opioids between July 1, 2011 and June 30, 2012 and who remained on opioids for 1 year. Cases were patients who experienced overall opioid dose escalation (defined as an increase of ≥ 30 mg morphine/day over 1 year); cases were matched with 2 randomly selected control patients without dose escalation. Two coders independently reviewed all encounters with opioid prescriptions during each patient's first year on opioids and classified each prescription as either a dose increase, dose decrease, or no change based on physician documentation. Coders abstracted encounter type, 10 pain management practices recommended by VA and American Pain Society guidelines, and physicians' clinical reasoning for each prescription. Disagreements were resolved by discussion. Descriptive statistics were used to analyze prescriptions, clinical reasoning, and guideline-concordant pain management. Mixed-effects logistic regression was used to compare patients with versus without overall opioid dose escalation.

RESULTS: We coded 675 encounters involving opioid prescriptions for 66 patients; 22 with overall opioid dose escalation and 44 without dose escalation. Inter-coder agreement (kappa) for prescription classification variables ranged from 0.73 to 0.91. Thirty-four percent of prescriptions were classified as opioid dose increases, 8 % as dose decreases, and 59 % as no change. Sixty-seven percent of all prescriptions and 38 % of opioid dose increases took place via email or telephone encounters without face-to-face patient contact. Forty-two percent of all prescriptions and 31 % of opioid dose increases had no reason documented for the opioid prescription. When physicians documented reasoning for an opioid dose increase, the most common reasons were inadequate pain relief (23 %), increased pain severity (15 %), and patient request (11 %). Patient self-escalation was documented for 11 % of opioid dose increases involving case patients,

compared to 2 % involving controls. Physicians documented significantly more guideline-concordant pain management practices for patients with overall dose escalation compared to controls (3.9 versus 2.4, $P<0.001$). There was no significant difference between cases and controls for prescription classification, proportion of encounters without face-to-face patient contact, or proportion of prescriptions without documented reasoning.

CONCLUSIONS: During patients' first year of long-term opioid therapy for pain, the majority of opioid prescriptions and over one-third of opioid dose increases were written without face-to-face patient contact. Many opioid prescriptions and dose increases contained no explanation for the prescription. We found few significant differences in documentation between patients with versus without overall dose escalation. These findings suggest that physicians may pay relatively little attention to patients' opioid dose or to the rationale for continuing opioids during the first year of treatment. The frequency of prescriptions written without face-to-face patient contact likely contributes to this phenomenon.

DUAL THERAPY FOR PSEUDOMONAS AND OUTCOMES IN HEALTHCARE ASSOCIATED PNEUMONIA Michael B. Rothberg²; Marya Zilberberg³; Penelope S. Pekow¹; Aruna Priya¹; Sarah Haessler¹; Tara Lagu¹; Thomas Higgins¹; Peter K. Lindenauer^{1, 1}. ¹Baystate Medical Center, Springfield, MA; ²Cleveland Clinic, Cleveland, OH; ³University of Massachusetts, Amherst, MA. (Tracking ID #2197976)

BACKGROUND: Guidelines for treatment of healthcare-associated pneumonia (HCAP) recommend that empiric therapy include 2 agents with activity against *Pseudomonas* for all patients. The recommendation is based primarily on studies of ventilator associated pneumonia. The objective of this study was to examine the association between dual therapy for *Pseudomonas* (DT) and outcomes for patients with HCAP.

METHODS: We conducted a retrospective cohort study at 338 US hospitals that participate in the Premier data consortium. We included all adults hospitalized for HCAP between July 2007 and June 2010. All patients received empiric therapy for Methicillin resistant *Staphylococcus aureus* (as per HCAP guidelines) and either one or two agents with activity against *Pseudomonas*. Patients who received DT begun on hospital day 1 or 2 were compared with those who received single therapy (ST). The primary outcome was in-hospital mortality. Secondary outcomes included late deterioration (admission to intensive care unit (ICU), mechanical ventilation, or pressors on day 3 or later), 30-day readmissions, acute kidney injury, *C. difficile* infection, length of stay, and costs. We developed a hierarchical logistic regression model for treatment to produce propensity scores for DT vs. ST. Stabilized inverse probability of treatment weighting was used to model outcomes. Multivariable hierarchical generalized linear models were developed to assess the independent association between exposure to DT for each outcome adjusted for patient characteristics, other early treatments, propensity for dual therapy, predicted mortality, and hospital characteristics. We also conducted a stratified analysis to determine the presence of treatment effect heterogeneity based on severity of illness. We considered the following strata: ICU patients treated with mechanical ventilation or pressor medications, other ICU patients, and non-ICU patients. SAS software procedure GLIMMIX was used to account for the hierarchical nature of the data (patients clustered within hospital and with hospital as a random effect).

RESULTS: Of 31,949 patients at 338 hospitals, 14809 (46.4 %) received DT, and 17140 (53.6 %) received ST. Compared to patients who received ST, those who received DT were similar in age and co-morbidity profile but were more likely to be admitted initially to an ICU (45.4 % vs 36.0 %, $p<0.001$), and had higher observed mortality (17.6 % vs. 16.7 %, $p<0.001$). After adjustment for demographics, comorbidities, propensity for dual therapy, and initial severity of disease, receipt of DT was associated with lower risk of mortality (OR 0.93, 95 % CI 0.87–0.99), but the number-needed-to-treat to prevent one inpatient death was 146. Effectiveness of dual coverage did not vary by severity of illness. In covariate adjusted models there were no differences between DT and ST in rate of late deterioration, readmissions, acute kidney injury, *C. difficile* infection, cost, or length of stay.

CONCLUSIONS: Among HCAP patients receiving antibiotics for MRSA and *Pseudomonas*, dual coverage for *Pseudomonas* was associated with slightly better short term survival but a large number-needed-to-treat. Better tools are needed to identify patients who might benefit from dual coverage.

EARLY CLINICAL EDUCATION CAN IMPROVE MEDICAL STUDENTS' CLINICAL REASONING BEFORE CLERKSHIPS Heather L. Heiman²; Celia O'Brien³; Toshiko Uchida²; John Butter¹; Marsha E. Yelen³; Patricia M. Garcia¹. ¹Northwestern Feinberg School of Medicine, Chicago, IL; ²Northwestern University Feinberg School of Medicine, Chicago, IL; ³Northwestern University Feinberg School of Medicine, Chicago, IL. (Tracking ID #2198569)

BACKGROUND: Responding to calls for educational reform, medical schools have increasingly introduced authentic clinical experiences into students' first 2 years. Early clinical exposure has been reported to improve professionalism, student satisfaction, and history-taking. Clinical reasoning is rarely a stated objective of early clinical exposure, but experts have called for earlier introduction of diagnostic reasoning in medical education. In restructuring our 4-year curriculum, we strengthened clinical medicine instruction for pre-clerkship students. We examined the impact of this change on students' self-assessed diagnostic reasoning and other synthetic clinical skills shortly after entering clerkships.

METHODS: In the prior curriculum, students received two hours per week of clinical medicine instruction. In year 1, standardized communication and physical exam instruction occurred in the clinical education center (CEC). In year 2, students worked with a clinical preceptor every other week, returning to the CEC to reinforce skills on alternate weeks. They also submitted 5 history and physicals for hospitalized patients. Starting in 2012, students received three hours of clinical medicine each week in the pre-clerkship phase. Key tenets of the new curriculum included integration of clinical content with basic sciences, continuity of mentorship, and augmented student assessment. Students met patients in weekly "clinical correlations"; the patients had illnesses students were studying in science. In each interactive lecture, students learned a clinical skill relevant to the care of that patient, and in the ensuing weeks they practiced it. Students worked with two clinical mentors at all times. A small-group mentor provided standardized skills training, and a clinical mentor oversaw authentic patient experiences. To promote learning, we diversified and increased assessments. Observed structured clinical examinations increased from two to three per year. In addition to receiving eight preceptor evaluations, students had semi-annual direct observations, and multiple choice examinations began including clinical medicine content. Students completed written assignments for 9 hospitalized patients. The Clinical Skills Preparation Survey was administered from 2007 to 2014 to all students following the first month of clinical clerkships. Students rated how their clinical skills courses prepared them for their first clinical rotation using a 5-point scale. Here we focus on student ratings of 7 skills related to clinical reasoning and on the overall clinical preparation score. We omitted 107 students who did not enroll in a clerkship at the start of the academic year. We achieved an 87 % response rate to obtain a final sample of 1036 medical students, 129 of whom participated in the new curriculum. We ran Mann-Whitney *U*-tests to compare students in the two groups. Pearson's correlation coefficient (*r*) was calculated to test the magnitude of significant findings.

RESULTS: Students who participated in the new clinical skills curriculum reported feeling significantly more prepared in all 7 specific reasoning skills and overall (Table). Old curriculum students rated themselves as prepared (above a 3) for two of seven skills: evaluating outpatients and writing a history and physical. New curriculum students rated themselves as prepared in five of seven skills: evaluating outpatients, writing a history and physical, constructing a problem list, formulating a differential diagnosis, and giving oral presentations. The largest effect size ($r=0.30$) was seen in formulating a differential diagnosis.

CONCLUSIONS: A revised clinical skills curriculum was associated with improvements in student confidence in abilities that reflect clinical reasoning, including generation of a differential diagnosis and a problem list. The AAMC has stated that these skills are required at entry to clerkships and are an entrustable professional activity for entering residency. We believe improved integration of content, precepting, and assessment account for this improvement. The transition to clinical years has been described as stressful, and the need for clinical reasoning can be an abrupt change from pre-clinical years. Lowering the stress of this transition by preparing students to reason clinically may create more opportunities for learning early in clerkships.

Comparison of student preparedness levels between old (2007–2013) and new (2014) curriculum

*1=not prepared at all, 3=prepared, 5=extremely well prepared

Skill/ability	2007–2013 n	2007–2013 M*	2014 n	2014 M*	p	r
Evaluate a hospitalized patient	912	2.58	121	2.81	<.01	–0.08
Evaluate outpatients	908	3.15	122	3.60	<.001	–0.14
Construct a problem list	913	2.56	122	3.19	<.001	–0.21
Formulate a differential diagnosis	914	2.33	122	3.18	<.001	–0.30
Formulate a treatment plan	914	1.80	122	2.35	<.001	–0.22
Give oral presentations	914	2.55	122	3.14	<.001	–0.21
Write a history physical	116	3.24	122	3.47	<.05	–0.14
Overall clinical skills preparedness	914	2.89	122	3.39	<.001	–0.22

n=number of students, M=mean, r=Pearson's correlation coefficient for effect size

EARLY EFFECTS OF LORCASERIN ON GLYCEMIC PARAMETERS IN OBESE AND OVERWEIGHT PATIENTS WITH TYPE 2 DIABETES MELLITUS: A RETROSPECTIVE ANALYSIS OF BLOOM-DM Elisa Fabbrini³; Randi Fain¹; Alan Glicklich²; Yuhua Li¹; William Shanahan²; William Soliman¹. ¹Eisai Inc, Woodcliff Lake, NJ; ²Arena Pharmaceuticals, San Diego, CA; ³Washington University School of Medicine, St Louis, MO. (Tracking ID #2198474)

BACKGROUND: Pre-clinical data show that 5-HT_{2C} activation may improve insulin resistance. Lorcaserin (LOR) is a selective 5-HT_{2C} agonist that has been shown to significantly reduce weight, fasting plasma glucose (FPG), and hemoglobin A1c (HbA1c) in overweight/obese patients with type 2 diabetes mellitus (T2DM) over 1 year. This retrospective analysis studied the glycemic effects of LOR at earlier time points.

METHODS: The BLOOM-DM trial enrolled patients with BMI 27–45 kg/m² and T2DM uncontrolled by oral antidiabetic drugs. Patients were randomized to LOR 10 mg twice daily (BID) (*n*=256) or placebo (PBO) (*n*=253). All patients received a standard diet and exercise program. Primary endpoints were the percent of patients achieving ≥5 % and ≥10 % weight loss, and the mean change in weight at week 52. This analysis retrospectively evaluated the effects of LOR on changes in FPG, fasting insulin, HbA1c, and body weight (BW) after 2 (FPG, fasting insulin, and BW only), 24, and 52 weeks of therapy in the modified intent-to-treat (MITT) population (last observation carried forward).

RESULTS: LOR significantly reduced FPG beginning at week 2 (−27.8 [LOR] vs −15.4 mg/dL [PBO], *p*<0.001), prior to substantial changes in BW (−1.0 [LOR] vs −0.7 kg [PBO], *p*=not significant). Reductions in FPG with LOR were maintained (week 24: −29.3 [LOR] vs −16.4 mg/dL [PBO], *p*=0.001; week 52: −29.2 [LOR] vs −11.4 [PBO], *p*<0.001), with no significant effect on fasting insulin observed at any time point (week 2: −2.04 [LOR] vs −2.55 [PBO]; week 24: −2.46 [LOR] vs −1.12 [PBO]; week 52: −2.68 [LOR] vs −1.91 [PBO] μIU/mL). Significant reductions in HbA1c with LOR were observed at week 12 (−1.0 [LOR] vs −0.6 [PBO], *p*<0.0001), week 24 (−1.0 [LOR] vs −0.6 [PBO], *p*<0.0001), and week 52 (−0.9 [LOR] vs −0.4 [PBO], *p*<0.0001).

CONCLUSIONS: LOR reduced FPG as early as week 2 before substantial weight loss. These data suggest that LOR may play a role in regulating glucose homeostasis, independent of weight loss.

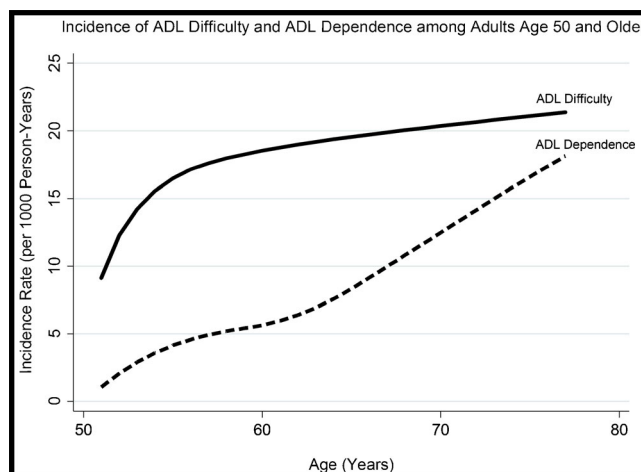
EARLY-ONSET FUNCTIONAL DIFFICULTY AND ITS RELATIONSHIP TO FUNCTIONAL DEPENDENCE Rebecca Brown; Yinghui Miao; Michael Steinman. Division of Geriatrics, University of California, San Francisco, San Francisco, CA. (Tracking ID #2196446)

BACKGROUND: Older adults are the age group most likely to experience functional dependence, meaning the need for help performing basic daily activities. However, functional difficulty—i.e., experiencing difficulty performing a task, though still performing it without help—may precede dependence by decades. Little is known about how functional difficulties arise at younger ages and how these difficulties relate to the emergence of functional dependence.

METHODS: We analyzed longitudinal data from 8680 participants in the nationally-representative Health and Retirement Study. Participants were age 50–56 at enrollment and free of impairment in activities of daily living (ADLs) and instrumental activities of daily living (IADLs). We analyzed data from these individuals at 2 year intervals for up to 20 years for new-onset functional difficulty and dependence. We defined ADL difficulty as self-reported difficulty performing 1 or more ADLs and ADL dependence as self-reported need for help performing 1 or more ADLs. We defined difficulty and dependence in IADLs similarly. The incidence of new-onset ADL and IADL difficulty and dependence at different ages were evaluated using flexible parametric survival analysis. Reported values incorporate survey weights to account for the complex survey design.

RESULTS: Overall, 54 % of participants were male and 80 % were white. The incidence of new-onset ADL difficulty increased rapidly as participants progressed from their early to mid-50s: at age 52, the incidence of new-onset ADL difficulty was 9 per 1000 person-years, rising to 17 per 1000 person-years at age 57. However, starting at age 58 the incidence rates rose much less steeply for each additional year of life, from 18 per 1000 person-years at age 58 to 21 per 1000 person-years at age 78. In contrast, the incidence of ADL dependence increased at a relatively constant rate with increasing age, from 1 per 1000 person-years at age 52 to 18 per 1000 person-years at age 78. The incidence of IADL difficulty and dependence by age showed a similar pattern.

CONCLUSIONS: Although functional dependence is usually thought of as a problem of older adults, its antecedents develop much earlier. Identifying functional difficulty and intervening when it first arises, in late middle age, may have the potential to prevent or slow the progression from functional difficulty to dependence.



EFFECT OF A COLORECTAL CANCER SCREENING DECISION AID ON DECISION MAKING OUTCOMES IN A LOW-INCOME, MAJORITY LATINO PATIENT POPULATION Alison Brenner¹; Danelle Callan²; Miriam Espaillet³; Khalil Harbi¹; Richard Hoffman⁴; Andrew McWilliams³; Michael Pignone⁵; Robert Rhyne²; Hazel Tapp³; Brisa Urquiza de Hernandez³; Mark Weaver⁵; Daniel S. Reuland⁵. ¹Cecil G. Sheps Center for Health Services Research, Chapel Hill, NC; ²University of New Mexico, Albuquerque, NM; ³Carolinas HealthCare System, Charlotte, NC; ⁴Albuquerque VAMC/University of New Mexico School of Medicine, Albuquerque, NM; ⁵University of North Carolina, Chapel Hill, NC. (Tracking ID #2196755)

BACKGROUND: Decision aids for colorectal cancer (CRC) screening have been shown to improve CRC screening-related decision making and test completion in highly-insured, English-speaking populations. However, the effects of such decision aids in diverse, vulnerable patient populations remain unclear, and they have not been tested in Latino patient populations in a clinic setting. We are currently conducting a pragmatic, randomized controlled trial of a two-component intervention that includes a CRC screening decision aid delivered before a provider visit and patient navigation delivered after the visit in safety net clinics. The full trial will eventually assess screening test completion as the distal outcome; this analysis examines the effect of the decision aid component of the intervention on intermediate decision-making outcomes.

METHODS: We enrolled primary care patients ages 50–75 at average CRC risk who were not current with recommended screening from two clinic sites that serve racially and ethnically diverse, low-income communities in North Carolina and New Mexico. After a baseline survey, participants were randomized to an intervention group who viewed a 14-min CRC screening decision aid video (in Spanish or English) before their provider visit, or a control group who viewed a food safety video. Immediately after their provider visit, participants completed an oral follow-up survey administered by a bilingual research assistant. Decision making outcomes included screening-related knowledge (on 6 item scale), discussions with the provider, test preferences, and test ordering. We also assessed intention to complete screening (on a 5-point Likert scale, dichotomized as “low intention” and “high intention” for analysis). We used Mantel-Haenszel row mean score tests to compare outcomes across study arms, controlling for baseline value where possible.

RESULTS: Participants (*n*=171) had mean age of 58 years and were 61 % female, 57 % Latino, 22 % non-Latino White, and 18 % African American. Most (69 %) had a household income of less than \$20,000; 48 % had limited health-literacy, 39 % were uninsured, and 43 % were Spanish-speaking. On the follow-up survey, intervention participants answered an average of 4.5 of the 6 knowledge questions correctly (vs. 2.4 at baseline), while control participants answered an average of 2.5 questions correctly (vs. 2.5 at baseline), difference in differences 2.1; (95 % CI 1.8, 2.5), *p*<0.001. Compared with controls, intervention participants were more likely to report having a screening discussion with their provider (71 % vs. 42 %, *p*<0.001); indicate having “enough information to decide” (96 % vs 69 %, *p*<0.001); indicate a specific testing preference (89 % vs 61 %, *p*<0.001), report high intention to complete screening (95 % vs 86 %, *p*=0.04), and have a screening test ordered (55 % vs. 33 %; *p*=0.003). Similar effects were observed for these outcomes when restricting the analysis to the Latino subsample.

CONCLUSIONS: In a low-income, racially and ethnically diverse patient population, a decision aid offered in a participant’s preferred language increases screening-related knowledge, clinical discussions, intent to complete screening, and test ordering, and is effective in both Latino and non-Latino patients.

EFFECT OF BASELINE TIMEFRAME ON POTENTIAL BIAS IN RISK FACTOR ASSESSMENT IN AN EHR-BASED COHORT Jason L. Vassy¹; Yuk-Lam Ho¹; David R. Gagnon¹; J. M. Gaziano¹; Jacqueline Honerlaw¹; Sanjay Raju¹; Peter W. Wilson²; Kelly Cho¹. ¹VA Boston Healthcare System, Boston, MA; ²Atlanta VA Medical Center, Atlanta, GA. (Tracking ID #2181953)

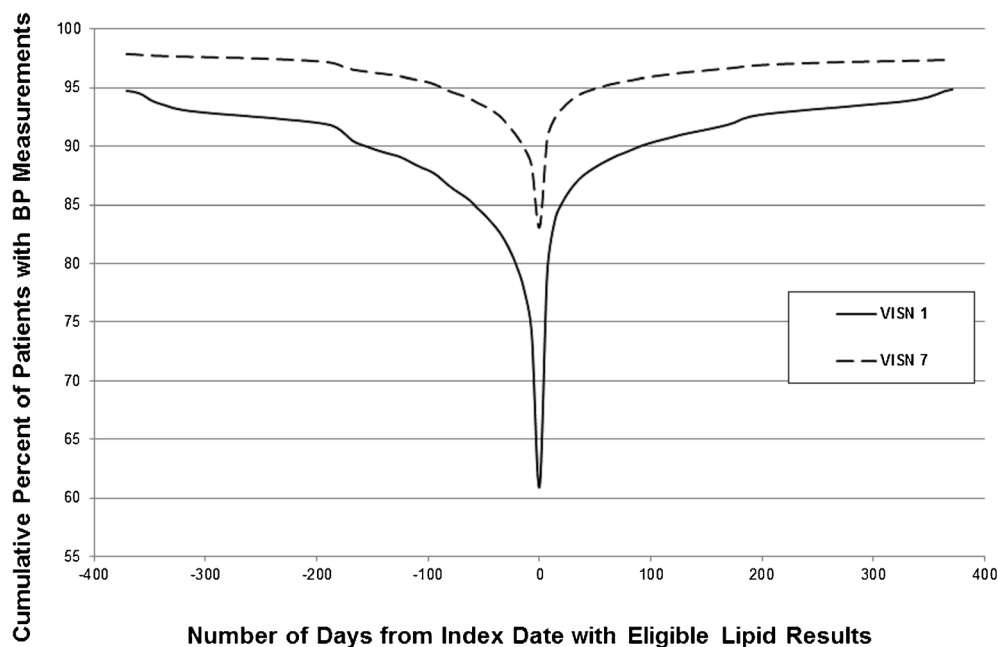
BACKGROUND: Prospective cohort studies in classical epidemiology begin with a baseline exam when risk factors are measured, after which participants are observed over time for health outcomes. Longitudinal patient data from electronic health records (EHR) hold potential for large-scale clinical epidemiology. However, they may necessitate flexibility in defining the timeframe of baseline risk factor assessment, since patients in a health system access care at varying frequencies. This variable schedule of contact with the health system may introduce information bias or selection bias to any study using such an EHR-defined cohort. In creating the first cardiovascular disease (CVD) cohort study using patient data from a large health system, we tested the hypothesis that widening the timeframe used to measure baseline CVD risk factors increases the yield of eligible patient data without introducing bias.

METHODS: To define a veteran cohort study, we used EHR data from the New England (VISN 1) and Southeast (VISN 7) Networks of the Veterans Health Administration. We identified 589,361 eligible VISN 1 and 7 patients, defined as having valid demographic data and ≥ 1 set of blood lipid results between 2000 and 2007. We anchored the index date

to the date of the first eligible lipid results. We then expanded the definition of the baseline timeframe by 1-week intervals before or after this date, assessing the proportion of eligible patients with blood pressure (BP) measurements with each successive widening of the baseline timeframe. We compared 3 mutually exclusive groups of patients: 1) those with BP from the exact index date, 2) those with BP not on the index date but within the VISN-specific 90th percentile to either side of the index date, and 3) those with no BP within the VISN-specific 90th percentile. We identified baseline CVD, diabetes, and mental health conditions from ICD-9 codes and aspirin use from pharmacy records. Driving time to facility was estimated from each patient's home zip code.

RESULTS: Group 1 contained 146,636 (61.0 %) and 289,906 (83.1 %) of the eligible patients in VISN 1 and 7, respectively. This proportion reached 90 % within +91 or -154 days from the index date in VISN 1 and within only +7 or -14 days in VISN 7. For each VISN, the 3 groups did not differ substantially in BP or LDL-C levels, but Group 3 had less available race data, lower prevalence of baseline comorbidities, and fewer outpatient contacts with the health system.

CONCLUSIONS: Creating a prospective CVD cohort from EHR data is feasible but may require special handling of patients with infrequent visits to minimize information and selection bias. The potential for bias may vary considerably across different regions within the same large integrated health system. Use of these methods can identify biases and allow modification of study design to eliminate them.



Time to nearest blood pressure (BP) measurement from index date of lipid results among New England (VISN 1) and Southeast (VISN 7) Network patients in the Veterans Health Administration

	VISN 1			VISN 7		
	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
n	146,636	85,932	7,911	289,906	40,807	18,169
Age (SD), years	64.3 (14.2)	64.8 (14.6)	59.8 (18.6)	59.7 (14.3)	60.7 (14.9)	58.3 (16.2)
Inpatient visits, median (IQR)	1 (1, 3)	1 (1, 2)	1 (1, 2)	1 (1, 2)	1 (1, 2)	1 (1, 2)
Outpatient contacts, median (IQR)	13 (6, 28)	9 (5, 20)	4 (2, 9)	13 (7, 24)	11 (6, 21)	8 (4, 15)
LDL-C (SD), mg/dL	108.3 (31.7)	110.0 (31.1)	110.9 (35.0)	111.8 (33.6)	110.8 (32.7)	109.8 (34.5)
SBP (SD), mmHg	133.3 (14.0)	132.8 (14.4)	132.4 (17.0)	134.3 (14.7)	133.5 (14.5)	132.7 (15.2)
Male (%)	96.2	96.0	94.5	93.7	92.8	91.6
Unknown/missing race (%)	19.0	26.0	42.9	24.2	35.6	41.3
Baseline CVD (%)	33.2	29.0	20.8	25.3	27.1	22.0
Diabetes (%)	20.6	17.7	11.6	20.1	20.1	14.8
Bipolar/Schizophrenia (%)	6.9	4.8	3.4	5.4	3.9	4.1
PTSD (%)	11.3	8.5	5.7	8.8	8.3	7.3
Aspirin use (%)	16.1	10.4	6.4	17.5	11.6	9.1
Time to facility (SD), min	45.3 (41.1)	44.5 (38.5)	42.8 (33.7)	60.2 (37.8)	76.8 (38.4)	74.1 (38.1)

Characteristics of New England (VISN 1) and Southeast (VISN 7) VA patients: Group 1) those with blood pressure (BP) measured on the exact index date of lipid results; Group 2) those with BP not on the index date but within the VISN-specific 90th percentile to either side of the index date, and Group 3) those with no BP within the VISN-specific 90th percentile. Data are means (standard deviations, SD), medians (interquartile ranges, IQR), or percentages, as appropriate. CVD, cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; PTSD, post-traumatic stress disorder; SBP, systolic blood pressure.

EFFECT OF EMPLOYEE HEALTH PLAN FINANCIAL INCENTIVES ON DIABETES AND CARDIOVASCULAR RISK FACTOR CONTROL

Anita D. Misra-Hebert; Bo Hu; Glen B. Taksler; Bruce Rogen; Robert Zimmerman; Michael B. Rothberg. Cleveland Clinic, Cleveland, OH. (Tracking ID #2195973)

BACKGROUND: Worksite wellness programs emphasize lifestyle changes and disease management in the work setting. Financial incentives associated with wellness program participation have the potential to change health behaviors and reduce downstream health care costs. However, it is unknown whether financial incentives improve disease management in participants when compared to those who voluntarily obtain care (without financial incentives). The purpose of the present study is to assess the impact of the introduction of employee health plan financial incentives on control of diabetes as well as control of other cardiovascular risk factors in employees with diabetes.

METHODS: We conducted a retrospective cohort study using insurance claims data linked with electronic medical records from January 2008–December 2012 in one health system. Study participants included Cleveland Clinic employees with diabetes covered by the organization's self-funded insurance plan which covers over 38,000 employees and over 82,000 lives with 3700 covered members with diabetes. We created a comparison group comprised of non-employee patients with diabetes and commercial health insurance, who were cared for in the same primary physician practices, and obtained care without financial incentives. Exposures included the introduction of an employer-sponsored disease management program, including an initial fixed financial incentive (\$100 in 2009, increasing to \$300 in 2010) that was tied to participation only, and a subsequent 30 % health insurance premium discount (\$600–\$1200 depending on plan chosen in 2011 and 2012) that was tied to both participation and achievement of specific clinical goals. Employees were matched in 2 year cohorts to correspond with the introduction of different levels of financial incentives. Each cohort included all employees with diabetes (both disease management program participants and non-participants) with at least one glycosylated hemoglobin (HbA1C) in both years. Employees were matched to non-employees using propensity scores from a model that included age, sex, body mass index (BMI), insulin use, initial HbA1C, and primary care site. Following the introduction of each incentive, in each cohort, we measured the change for employees vs. the matched non-employee comparison group in the following outcomes: HbA1C, low density lipoprotein (LDL), systolic blood pressure, and weight.

RESULTS: A total of 1092 employee patients with diabetes were matched to a comparison group of 1092 non-employee patients. With increasing incentives for participation in disease management programs, the proportion of eligible employees enrolled in the programs increased from 9 % in 2009 to 53 % in 2012 ($p < 0.001$); 9.8 % of all employees with baseline HbA1c > 9 enrolled in 2009 and 35.3 % in 2012 ($p < 0.001$). The baseline mean HbA1c of participants joining the program in 2009 was 7.52 and in 2012 was 7.35. In their first year in the diabetes management program, participants' HbA1C declined by 0.32 points (95 % Confidence Interval (CI) 0.21–0.43) and weight by 2.31 kg (95 % CI 1.45–3.17). The comparison group had similar HbA1C improvements (0.21 points, 95 % CI 0.08–0.34, difference in differences $p = 0.13$). The weight in the non-employee group declined 0.41 kg (95 % CI –0.14–0.96, $p = 0.01$ for the difference in differences). Offers of small, fixed financial incentives for program participation were temporally associated with small, non-significant decreases of HbA1C in all employees with diabetes (0.07–0.13 points, $p > 0.05$) while financial incentives tied to treatment targets were temporally associated with a HbA1C decline of 0.18, $p = 0.000$. However, similar changes were observed in the comparison group, implying that other secular factors may have been responsible for the decline. Weight decreased more significantly in the employee cohort than in the comparison group in 2012 (1.32 kg vs. 0.52 kg, $p = 0.02$). For the subgroup of employees with HbA1c > 9, the HbA1c continued to decline throughout the study but changes were similar in the comparison group. Mean LDL cholesterol also decreased for all employees throughout the study period, with similar reductions seen among the comparison group.

CONCLUSIONS: Compared to patients who sought care voluntarily, employees offered financial incentives to participate in disease management programs and achieve health targets had greater reductions in weight but not diabetic control or LDL cholesterol. Financial incentives encourage employees to enter diabetes management and may improve outcomes. Future research will consider the association of these financial incentives on long-term diabetes management, as well as overall health care utilization and expenditure.

EFFECT OF THE TAILORED ICD FACILITATED DISCUSSION ON PATIENT AND FAMILY DECISION-MAKING ABOUT CIED DEACTIVATION AT THE END OF LIFE: A PILOT RANDOMIZED CONTROLLED TRIAL Mark Hughes^{3,4}; Gayane Yenokyan⁵; Daniel Sulmasy¹; Lisa S. Lehmann²; Julie Johnson¹; Joan Kub⁶; Marie Nolan⁶; ¹University of Chicago, Chicago, IL; ²Brigham and Women's Hospital, Boston, MA; ³Johns Hopkins University School of Medicine, Baltimore, MD; ⁴Johns Hopkins University Berman Institute of Bioethics, Baltimore, MD; ⁵Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD; ⁶Johns Hopkins University School of Nursing, Baltimore, MD. (Tracking ID #2200035)

BACKGROUND: Guidelines on cardiovascular implantable electronic device (CIED) management recommend informing patients and families about CIED deactivation to prevent unnecessary shocks near death. An American Heart Association report calls for research on the timing, manner, and psychological impact of discussing CIED deactivation with patients and families. The purpose of this study was to pilot test the TAILORED (Trial to Advance Individual Loved Ones' Roles in End-of-Life Decisions) intervention on patient and family CIED decision-making outcomes.

METHODS: The study was conducted at two academic medical centers with diverse patient populations. Study subjects were dyads of adult patients with CIED and New York Heart Association (NYHA) Level II or III heart failure (HF) and an adult family member whom they might involve in health care decision making. Patients or family members with cognitive impairment were excluded. Dyads were randomized into intervention (INT) and control groups (CON). The TAILORED Intervention is a brief, nurse-facilitated, patient-family discussion involving assessment of patient preference for family involvement in health care decisions and support for family members involved in proxy decision making. As part of the discussions, the nurse provided a take-home handout to the dyad, which used illustrations to represent the decision-making role the patient preferred and the role that the family member thought the patient preferred. The patient and family member were encouraged to talk further about the patient's decision making style preferences. Four weeks after baseline, family members were telephoned to "booster" the intervention, in which they were asked if they had any questions about the intervention and if they had reviewed the take-home handout with the patient or other family members. If they had not yet developed a plan regarding CIED deactivation with the patient, they were encouraged to do so. Dyad members separately completed surveys at baseline (T1) and 8 weeks after the intervention (T2). The main outcomes were the creation of a plan regarding CIED deactivation at the end of life (ICD PLAN), decision making distress (measured with 22-item, 5-point Likert Impact of Event Scale (IES)), and decision making self-efficacy (measured with 7-item, 5-point Likert Family Decision-Making Self-Efficacy Scale). Descriptive statistics were used to summarize the demographic characteristics of the sample. Outcomes were compared between study arms at baseline and at 8 weeks using generalized linear regression models with adjustment for study site and robust variance to account for patient-level correlation over time.

RESULTS: The sample consisted of 56 dyads (27 INT, 29 CON); 43 (74 %) completed T2 surveys. Ten patients (5 in each group) died during study follow up. Mean age of patients was 61, 71 % were male, 61 % received CIED for prevention, and 48 % had received CIED shock before. Family members' mean age was 54 and 52 % were spouse or partner. Both CON and INT had increased ICD PLAN at T2 (CON: T1 11 % and T2 36 %, $p = .04$; INT: T1 24 % and T2 62 %, $p = .02$). Distress decreased in INT (IES: T1 20.9 ± 14.7 and T2 13.8 ± 14.1, $p = .01$), but increased for CON (IES: T1 17.9 ± 13.8 and T2 20.3 ± 21.7, $p = .45$). Total IES severity scores at T2 did not differ between groups ($p = .24$). Those with ICD PLAN at T2 ($N = 21$) tended to have lower levels of distress at T1 than those without a plan, but the relationship between distress and ICD PLAN at T2 did not differ between INT and CON ($p = .69$). Overall decision-making self-efficacy was high and did not change significantly from T1 to T2 (CON: T1 30.5 ± 4.5 to T2 30.9 ± 3.8, $p = .67$; INT: T1 29.4 ± 5.2 to T2 29.0 ± 6.9, $p = .82$), nor was self-efficacy different between CON and INT at T2 ($p = .29$). At T2, family members' confidence in decisions about deactivating CIED if the patient were conscious was 36 % for CON and 48 % for INT ($p = .63$), and if the patient were unconscious, confidence was 50 % for CON and 57 % for INT ($p = .61$). A negative relationship between self-efficacy scores and IES scores was suggested in conscious (–0.17, CI –0.89–0.55, $p = 0.64$) and unconscious scenarios (–0.29, CI –1.13–0.54, $p = 0.48$) after adjustment for time, study group, and study site. Imputing for missing data did not change study outcomes.

CONCLUSIONS: The majority of surrogates receiving the TAILORED intervention had a plan regarding CIED deactivation by the end of the study, but still less than the 100 % one would hope for. There tended to be more confidence in making a decision about CIED deactivation among intervention participants, but overall self-efficacy in end of life decisions was high in both groups. The data suggest that those who were less distressed at baseline were more likely to develop a plan about the CIED. Surrogates receiving the intervention showed decreased distress over time. Nurse-led interventions like TAILORED may help the process of CIED management by supporting family members in the decision making process.

ELECTRONICALLY MEASURING ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS IMPROVES CLINICIAN MANAGEMENT OF UNCONTROLLED HYPERTENSION: THE MATCH CLUSTER RANDOMIZED CLINICAL TRIAL Ian M. Kronish¹; Nathalie Moise¹; Thomas McGinn²; Yan Quan¹; William Chaplin³; Benjamin D. Gallagher¹. ¹Columbia University Medical Center, New York, NY; ²Hofstra North Shore-LIJ, Manhasset, NY; ³St Johns University, Jamaica, NY. (Tracking ID #2192543)

BACKGROUND: Up to 50 % of hypertensive patients are non-adherent to their blood pressure (BP) regimen. Thus, to appropriately manage uncontrolled hypertension, clinicians should ideally determine whether BP is not at goal due to a need for additional medication or due to insufficient adherence to medication. Yet, in practice, clinicians often fail to assess adherence. Even when assessed, clinicians are poor at accurately determining who is non-adherent and are often uncertain as to the true level of adherence. Our goal was to determine whether providing clinicians with electronically-measured medication adherence data at the time of visits with patients with uncontrolled hypertension would improve the management of uncontrolled hypertension.

METHODS: Between 2010 and 2014, we conducted a parallel two-arm cluster randomized trial at two hospital-based primary care clinics in New York City. Twelve primary care providers were randomly assigned to the intervention and 12 to usual care. Patients were assigned to the group in which their provider was randomized. One hundred patients (65 Intervention; 35 Control) with persistently uncontrolled hypertension (BP \geq 140/90 mmHg or \geq 130/80 mmHg if diabetes or chronic kidney disease) were asked to take their BP medications from an electronic pillbox (MedSignals) during the interval between two scheduled primary care visits. At the time of the second clinic visit, providers in the intervention group received a brief report that summarized the percent of doses that were taken as prescribed during the entire monitoring period and during the prior 7 days. Providers in the control group did not receive an adherence report. The primary outcome was the proportion of second visits with appropriate clinical management for uncontrolled hypertension. Clinical management was defined as appropriate if clinicians intensified the BP regimen or ordered testing for identifiable hypertension in adherent patients (\geq 80 % of doses taken as prescribed) or if they counseled about medication non-adherence in non-adherent patients ($<$ 80 % of doses taken as prescribed). Chart abstraction performed by two medically-trained study personnel blinded to group assignment was used to categorize clinical management. Key secondary outcomes including quality of care and clinician communication during the second visit were assessed by interviewing patients after the visit using standardized questionnaires. General estimating equation models (logit link) fitted with clinician as the cluster variable, "appropriateness of management" as outcome, and group assignment as the explanatory variable were used to determine the effect of the intervention.

RESULTS: The mean age of patients was 64 years, 72 % were women, 75 % were Hispanic, and 83 % had Medicaid. Mean BP at the time of the second visit was 155/83 mmHg, and 41 % were non-adherent during the monitoring period. There were no significant differences in sociodemographic or medical characteristics between patients in the intervention and control groups. The proportion of second visits with appropriate management was higher in the intervention group than in the control group (69 % versus 34 %; $p=0.001$). This corresponded to a greater proportion of adherent patients in the intervention group having their regimen intensified (56 % versus 21 %, $p=0.01$) and a greater proportion of non-adherent patients in the intervention group having adherence addressed by their provider (84 % versus 39 %, $p=0.005$). Patients in the intervention group were more likely to give their clinicians high ratings on overall quality of care ($p=0.05$), as well as on measures of patient-centered and collaborative communication about hypertension ($p=0.001$ and $p=0.02$, respectively). The majority of patients (64 %) found the electronic pillbox "very easy" to use, and almost all (94 %) said they would use the electronic pillbox again if asked by their clinician.

CONCLUSIONS: The integration of electronic adherence monitoring into clinical settings is a promising approach for improving the management of uncontrolled hypertension. This approach may be useful for improving the management of other health conditions such as diabetes or asthma for which an accurate assessment of medication adherence is essential to management decisions. Future studies should test the effectiveness of this intervention at improving medication adherence and BP control.

ELEPHANT IN THE ROOM? GENERAL MEDICINE FACULTY PERCEPTIONS OF THE IMPACT OF ELECTRONIC MEDICAL RECORD (EMR) ON PATIENT-DOCTOR COMMUNICATION Wei Wei Lee; Lollita Alkureishi; Jeanne M. Farman; Vineet M. Arora. University of Chicago, Chicago, IL. (Tracking ID #2196315)

BACKGROUND: Studies demonstrate that EMR use in exam rooms can prevent providers from focusing on patients. Despite widespread adoption of EMR in academic institutions in ambulatory settings, little is known about how general medicine faculty

providers perceive EMR adoption and their ability to integrate the EMR in a patient-centered manner. While there are known EMR-related skills that enhance the clinical interaction, few providers receive formal training. We aim to survey General Internal Medicine (GIM) faculty at the University of Chicago on their perceptions of EMR use and the impact on patient-doctor communication.

METHODS: After reviewing the literature, we developed a 34 item survey with five-point Likert-scale responses on knowledge, attitude and skills pertaining to EMR-related communication in the outpatient setting. One year after the University of Chicago implemented the EPIC ©EMR system in the outpatient clinic, we surveyed GIM faculty members at a monthly section meeting. The following is a sample question from the survey: How much do you agree with the statement 'I focus too much on the EMR and not enough on what the patient is saying.' Likert responses at the high end of the scale were grouped to dichotomize data (i.e. agree/strongly agree) and descriptive statistics were summarized.

RESULTS: Thirty one (31/32, 97 %) GIM faculty surveys were analyzed. The majority [58 % (18/31)] of respondents were female and the mean age was 47 (range 33–59). Fewer than a third [28 % (9/31)] rated their knowledge of 'Patient-Centered EMR Use' as good or excellent, with just over a third [35 % (10/31)] reporting their skill level as proficient or expert. Despite this, nearly two thirds of respondents (64 %, 20/31) reported they often or always integrated EMR-use with patients in the clinic room. However, respondents also reported agreeing with many statements about the pitfalls of EMR in the room. For example, 42 % (13/31) agreed that 'EMR use negatively impacts my ability to communicate with patients' and just over a third [35 % (11/31)] reported that 'the EMR negatively impacts the patient-doctor relationship.' Unfortunately, 42 % (13/31) agreed that they 'focus too much on the EMR and not enough on what the patient is saying,' with the majority [68 % (21/31)] reporting agreement with 'I do not maintain adequate eye contact with the patient while using the EMR.' Forty two percent (13/31) agreed that 'using the EMR during the clinic visit is stressful' and only half [52 % (9/31)] were 'confident in their ability to use the EMR in a patient-centered manner.' Roughly one third [28 % (9/31)] of respondents agreed that 'prior to the EMR, I provided better patient-centered care.' While 45 % (14/31) reported the 'training on patient-centered EMR use' was very or extremely important to their clinical practice, only 1 person (3 %) rated their training as good or excellent. The majority of respondents (71 %, 22/31) agreed that 'training on patient-centered EMR use should be required for all attendings.'

CONCLUSIONS: Faculty members in an academic general medicine practice report that EMR use can negatively impact patient-doctor communication in the outpatient setting, and that they struggle with eye contact and using the EMR in a patient-centered manner. Despite available best practices on EMR-related communication skills, few faculty members receive formal training. Faculty development courses should be implemented to address this gap in continuing medical education.

END OF LIFE DISCUSSIONS AMONG MEDICARE BENEFICIARIES Minal Kale²; Katherine Ornstein¹. ¹Mount Sinai, New York, NY; ²Mount Sinai School of Medicine, New York, NY. (Tracking ID #2197878)

BACKGROUND: Delivering high-quality care at the end of life has been a growing focus in health care, particularly as people live longer and age with multiple chronic diseases. Clear communication and elicitation of people's preferences regarding end-of-life is considered a central component to providing patient-centered care. However, attempts to make health policies that would promote these discussions, through new reimbursement structures for advance care planning have been mischaracterized as "death panels" and have delayed the wide-spread acceptance of advance care planning. Using a nationally representative survey of Medicare beneficiaries, we examined the characteristics and predictors of individuals having end-of-life discussions.

METHODS: We used data from the National Health and Aging Trends Study (NHATS), a nationally representative longitudinal survey of Medicare beneficiaries over age 65 that has been conducted annually since 2011. NHATS includes detailed information on self-reported activities of daily life, health conditions, living arrangements, well-being, sociodemographic characteristics, and physical measures of health. Round 2 of the survey includes a module of questions regarding end of life plans and care that was administered to a random sample of the survey respondents. We examined the sociodemographic and clinical characteristics of Medicare beneficiaries, and performed a multivariate logistic regression model to determine predictors of having engaged in end-of-life care discussions.

RESULTS: One thousand nine hundred sixty-four individuals completed the end-of-life module, representing a weighted sample of 9,219,720 individuals. In multivariate logistic regression analysis the following variables were associated with not having end of life discussions: females (Odds Ratio [OR]: 0.79, (95 % Confidence Interval [CI]: 0.65–0.98), black race (OR: 0.41, 95 % CI: 0.30–0.56), and other race OR 0.50, 95 % CI 0.29–0.85). Those who had completed high school/GED (OR: 1.59, 95 % CI: 1.16–2.17), some

college (OR 2.67, 95 % CI: 1.90–3.74), had larger social network size (OR: 1.21, 95 % CI: 1.08–1.35), and English language speakers (OR: 3.03, 95 % CI: 1.25–7.35) were more likely to have completed the discussion. We found that increasing age, marital status, Medicaid insurance, multimorbidity, frailty, having a regular doctor, self-reported bad health, and having been hospitalized were not significant predictors ($p>0.05$ for all comparisons).

CONCLUSIONS: In our analysis of a nationally representative survey of Medicare beneficiaries, we found that sociodemographic characteristics including race, education status, English language use, and social network size were significantly associated with having had a discussion about end-of-life care. Surprisingly, several markers of poor health, including self-reported poor health, frailty, multimorbidity, and hospitalization in the previous year were not associated with having this discussion. Our results suggest that efforts to promote end of life discussions might benefit from structural changes that could target those with high health care needs.

ENGAGING STAKEHOLDERS IN DEFINING FACTORS OF BUILDING AND SUSTAINING TRUST IN COMMUNITY-ENGAGED RESEARCH PARTNERSHIPS

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BACKGROUND: Collaboration between communities and academic institutions are receiving increasing attention as a strategy to address health disparities. Building and maintaining trust is critical in the development of effective collaborations and a key outcome of successful community-engaged partnerships. The primary objective of this multisite pilot study was to engage stakeholders in defining determinants of trust in community-engaged research (CEnR) and as a result develop a framework for measuring trust in CEnR, a vital long-term outcome highlighted in the national Clinical and Translational Science Award (CTSA) community engagement model

METHODS: Conceptually guided by Carpio's model linking Putnam's seminal work and Bourdieu's conceptualization of social capital, the study was conducted at four CTSA sites—University of North Carolina at Chapel Hill, University of Arkansas Medical Sciences, University of California at Los Angeles and University of Florida, with the University of Pittsburgh serving as the coordinating center for data collection, analyses and reporting. Three stakeholder groups who had some experience with CEnR—community members, healthcare providers and academicians, participated in three sessions: brainstorming, rating and sorting and, interpretation. During the brainstorming session, participants provided input to the following prompt “Based on your experience(s), list all the things that you think contribute to trust between community and academic partners in research?” All statements, consolidated into a master list, were then rated and sorted on: Importance for creating trust between community and academic partners in research; influence on the general public's trust of research; and, importance for maintaining trust between community and academic partners in research. We used concept mapping, a structured, respondent-driven, mixed-methods approach, which produces a visual

framework for how study participants conceptualize key determinants of trust in CEnR and describe ways in which those factors relate to each other. Using the Concept Systems Global Max © software, we conducted hierarchical cluster analysis and explored the relative importance of the statements to developing and maintaining public trust in CEnR.

RESULTS: A total of 186 participants provided input during the brainstorming session across four sites generating 2172 individual items that were consolidated into 125 unique items. During the second session, 156 participants rated and sorted the 125 items. A point-series map was created, each point/number representing 125 unique items, the points that are closest to each other are items that were group together most frequently whereas items that were further away from each other are considered less similar. During the interpretation session, 143 participants used the point series map to determine how many “clusters” or themes the data should be organized into, and to give each cluster a name. Participants divided the final 125 items master list into five clusters (figure 1): authentic, effective and transparent communication; mutually respectful and reciprocal relationships; sustainability; committed partnerships; and, communication, credibility and methodology to anticipate and resolve problems.

CONCLUSIONS: This study increases our understanding and improves our assessment of the underlying factors contributing to building and sustaining CEnR partnerships and public trust in research from diverse stakeholder perspectives. This study is an important first step in identifying an initial set of determinants of trust that can be applied and measured across CTSA or CEnR partnerships to: 1) understand differences and similarities in trust across sites; 2) identify both positive and negative determinants of trust; 3) identify characteristics that maintain trust; and 4) inform the direction future research to assess the fidelity of related conceptual frameworks for building trust in CEnR.

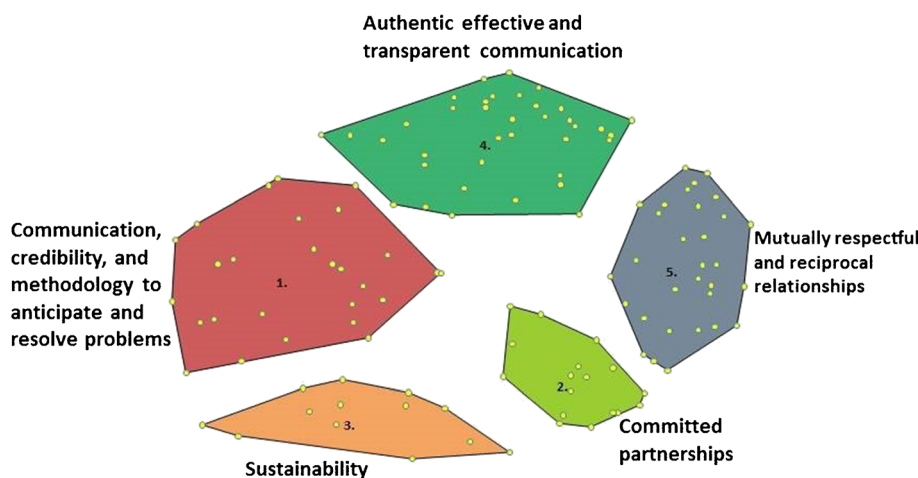
EPIDEMIOLOGY OF VENTILATOR ASSOCIATED PNEUMONIA AND TIME TRENDS OF MULTIDRUG RESISTANT BACTERIA IN THE GERIATRIC POPULATION

Theodora Anagnostou¹; Marios Arvanitis²; Themistoklis Kourkoumpetis²; Panayiotis Ziakas³; Athanasios Desalemos²; Eleftherios Mylonakis³. ¹Mount Auburn Hospital, Boston, MA; ²Boston Medical Center, Boston, MA; ³Rhode Island Hospital, Brown University, Providence, RI. (Tracking ID #2156055)

BACKGROUND: Ventilator Associated Pneumonia (VAP) is associated with high morbidity and mortality and annual costs of \$3.5 billion. The increased rate of comorbidities in the elderly and their frequent hospitalizations can alter the microbial colonization rates. To contribute to our understanding of the pathogenesis of this infection in the geriatric patients, we ventured to elucidate the differences of VAP in the elderly population.

METHODS: We conducted a retrospective analysis of the medical charts of all 208 patients admitted to the adult medical and surgical intensive care units of the Massachusetts General Hospital that developed VAP during a 5 year period. In order to evaluate the specific characteristics and outcomes of VAP in the elderly, we separated our population in two groups using the cutoff of 65 years. Group comparison was made using the Mann-Whitney non-parametric test. Count data were reported as % frequencies and compared

FINAL Cluster Map with Names



using the Fisher's exact test. Between-group differences were adjusted by performing a multivariable logistic regression analysis, for parameters with $p < 0.10$ at the group analysis. Adjusted effects were reported as Odds Ratio (OR) with their 95 % confidence interval. Survival analysis was performed using the Kaplan-Meier method and the log-rank p statistic was reported. All tests were two-tailed, with significance level set to < 0.05 . Stata v11 (College Station, TX), was used for data analysis.

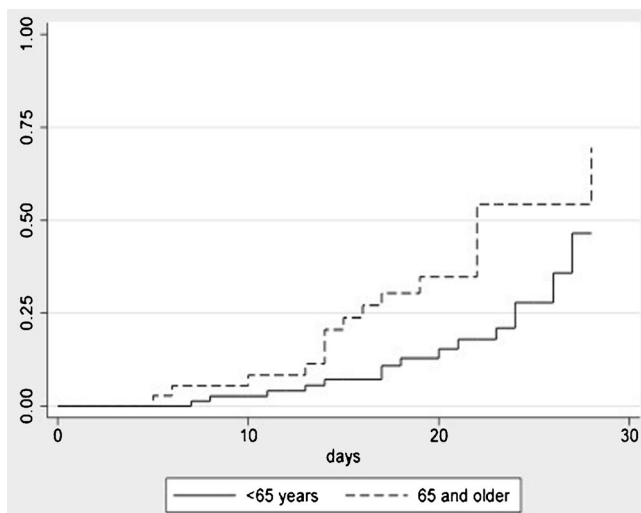
RESULTS: Two hundred patients were included in the study of which 72 (36 %) were above 65 years old. Interestingly, the two populations had comparable disease severity on ICU admission (median SAPS II score 37.5 vs. 37, $p = 0.48$) and did not differ on other markers of illness severity such as *Candida* colonization (33 % vs. 35 %, $p = 0.82$). However, the older population had higher prevalence of pulmonary comorbidities (37 % vs. 13 %, $p = 0.005$) and marginally higher prevalence of diabetes mellitus (24 % vs. 13 %, $p = 0.08$). Age (HR 1.04 95 % CI 1.01–1.07, $p = 0.003$) was an independent predictor of mortality and age ≥ 65 years was associated with increased incidence of VAP due to multidrug resistant bacteria (MDRB) (44 % vs. 28 %, $p = 0.07$). However, in multivariate analysis, multidrug resistant infection (HR 1.50, 95 % CI 0.54–4.17, $p = 0.44$) was not an independent risk factors for 28-day mortality in this population. Finally, MDR VAP rates in our hospital decreased over the study period, likely as a result of the World Health Organization Guidelines regarding Hygiene measures.

CONCLUSIONS: Patients above 65 years old have 3 times higher mortality compared to younger adults and increased incidence of multidrug resistant bacteria.

Factors associated with 28-day mortality in VAP in multivariate analysis

	Hazard Ratio	95 % Confidence Intervals	p -value
Age ≥ 65 years	2.82	1.12–7.11	0.03
Male gender	1.30	0.49–3.49	0.60
SAPS II	1.05	1.01–1.08	0.01
MRSA	1.50	0.54–4.17	0.44
Pulmonary comorbidities	0.88	0.31–2.50	0.81

MDR: multidrug resistant; SAPS II: simplified acute physiology score II; VAP: Ventilator associated pneumonia.



Twenty eight-day mortality in VAP in relation with age, failure rate estimates. Elderly patients (≥ 65 years old) displayed significantly higher mortality (log-rank $p = 0.01$).

ESTABLISHING AND TEACHING A STANDARD FOR TEST RESULT MANAGEMENT: RESIDENT REVIEW QUEUE COVERAGE PILOT kara greenwald³; Jennifer Rockfeld²; Barbara Porter¹. ¹NYU SOM, New York, NY; ²NYU School of Medicine, New York, NY; ³new york university school of medicine at bellevue hospital center, New York, NY. (Tracking ID #2152764)

BACKGROUND: Seven to thirty percent of abnormal test results are not managed in a timely fashion in outpatient settings nationally. (1) No standard exists for outpatient test

result management. In a December 2013 needs assessment, there were a total of 569 unsigned abnormal test values among 23 s and third year residents who had not been in clinic more than once in the preceding 2 weeks in the Bellevue Adult Primary Care Center (APCC). The objective of this study was to develop a standard for residents to act on abnormal test results in a timely fashion in the Bellevue APCC by creating a supportive infrastructure.

METHODS: We designed and taught a resident curriculum on panel management and electronic medical record (EMR) test result features. Residents provided feedback on the curriculum and coverage system which informed modifications to the curriculum and system. We set a standard of reviewing test results weekly. In January 2014 we started a coverage system where residents on ambulatory care block cover test results for residents on rotations with infrequent clinic and residents are given scheduled time to do coverage. Volume of unsigned test results for all residents receiving coverage was counted every 2 weeks. When a resident was found to have over 50 unsigned abnormal test results they received a personalized intervention. Abnormal test result volume was monitored every 2 weeks for residents who received personalized intervention.

RESULTS: All Bellevue APCC residents completed the curriculum; approximately 150 residents. At baseline in December 2013 there was an average of 24 unsigned abnormal results per second and third year residents on a rotation with infrequent clinic in the preceding 2 weeks. Five of six residents with high volume review queues (up to 244 abnormal results) showed improvement in test result volume. We observed a 42 % reduction in unsigned abnormal results by week 8, 80 % reduction by week 14, and from week 14 on have had sustained reduction as low as 90 % reduction, last in August 2014 down to 6 results per resident from 24 at baseline. Residents reported having enough time for coverage, satisfaction with coverage system and reduced anxiety about test results. Approximately 25 % of second and third year residents were not aware of EMR result features.

CONCLUSIONS: We created a standard for test result management, a curriculum to teach the standard, basics of panel management and EMR results features, incorporated learner feedback into the curriculum and implemented a resident to resident coverage system for abnormal test results. With these interventions we standardized test result management, created a supportive infrastructure, and increased awareness about the review queue and panel management. We overcame key barriers to timely follow up of abnormal results: resident time, location and knowledge gaps. We also identified deficits in resident education and engaged residents to improve the residency curriculum. The observed sustained reduction in unsigned abnormal results demonstrates the success of our interventions.

ETIOLOGIES AND SHORT-TERM MORTALITY AMONG PATIENTS WITH ULTRA-ELEVATED SERUM FERRITIN LEVELS Timothy C. Beer; Joseph Vadakara. Geisinger Medical Center, Danville, PA. (Tracking ID #2192812)

BACKGROUND: Higher serum ferritin levels (SF) have been demonstrated to be associated with poorer outcomes in several disease states, including cirrhosis, renal disease and several types of cancer. Several studies have evaluated the distribution of etiologies among patients with highly elevated SF. However, few of these studies seem to report on mortality. The purpose of this study is to evaluate the distribution of etiologies and short-term mortality of patients with SF above 5000 ng/mL.

METHODS: We queried our institutional EMR database for adults with SF above 5000 ng/mL measured between July 2004 and August 2014. For patients with multiple SF above 5000 ng/mL, only the first measured level was considered. All eligible patients had their age, gender, SF, contributing etiologies (up to three) and status ("alive" versus "deceased" and length of time between SF measurement and death) extracted for use in this study. Contributing etiologies for hyperferritinemia were determined by review of laboratory, radiographic and pathologic data as well as clinical notes. Based on previous publications, the following diagnoses were considered as potential etiologies for hyperferritinemia: acute liver injury (including fulminant liver failure, shock liver and acute hepatitis), cancer, blood transfusions, myelodysplastic syndrome (MDS), end stage renal disease (ESRD), hereditary hemochromatosis, systemic juvenile idiopathic arthritis (sJIA), hemophagocytic lymphohistiocytosis (HLH) and macrophage activation syndrome (MAS). Etiologies for patients who did not have one of these diagnoses were classified as "unknown." Mortality rates were calculated for 30 days and 6 months following the date of index SF measurement.

RESULTS: A total of 405 patients with SF above 5000 ng/mL were identified. The mean age was 60 years (range 18–90), 63 % were male, mean SF was 12,280 ng/mL (range 5010–97,372 ng/mL), mean 30-day mortality was 32 % and mean 6-month mortality was 50 %. Roughly half of patients (51 %) had multiple identifiable etiologies for their hyperferritinemia, 44 % had only one etiology and 5 % had no identifiable etiology. Among all patients, the three most commonly identified contributing etiologies were blood transfusions (48 %), liver injury (44 %) and cancer (33 %). Among patients with only one etiology for their hyperferritinemia, liver injury (73 %) was most common, followed by blood transfusions (9 %) and cancer (8 %). No patient had ESRD or MDS as a

sole etiology. Among all patients, mean SF was highest among those who had MAS (60,681 ng/mL), HLH (40,645 ng/mL) or liver injury (16,444 ng/mL) as a contributing etiology. Among patients with only one identified etiology, mean SF was again highest among those with MAS (60,681 ng/mL), HLH (34,389 ng/mL) and liver injury (14,894 ng/mL). Among patients with only one identified etiology, only those with liver injury (22/131), HLH (1/2) or MAS (1/1) had any SF above 20,000 ng/mL. Among all patients, 30-day mortality was highest among those with HLH (50 %), cancer (39 %) or liver injury (39 %) and 6-month mortality was highest among those with HLH (75 %), cancer (70 %) or MDS (56 %). Among patients with only one identified etiology, 30-day mortality was highest among those with HLH (100 %), cancer (64 %) and liver injury (33 %) and at 6 months remained highest among those with HLH (100 %), cancer (93 %) and liver injury (39 %).

CONCLUSIONS: The majority of patients with SF above 5000 ng/mL had multiple contributing etiologies for their extreme hyperferritinemia. Neither ESRD nor MDS was the sole etiology for a single case of SF above 5000 ng/mL. These two findings contrast with those of some previous reports, likely due to our approach of allowing for multiple contributing etiologies for SF elevations. Among patients with a single identified etiology for hyperferritinemia, liver injury (73 %) was by far most commonly responsible, followed distantly by blood transfusions (9 %) and cancer (8 %). HLH and MAS were associated with the highest mean SF, however, because these syndromes are so rare, even the most astronomically elevated SF levels are more likely to be due to liver injury. Indeed, in this study, liver injury accounted for 92 % of single-etiology cases of SF above 20,000 ng/mL. Among patients with cancer as their only etiology for hyperferritinemia, mortality was quite high at 30 days (64 %) and rose significantly by 6 months (93 %). In contrast, among patients with liver injury as their only etiology, mortality only increased by 6 % between 30 days (33 %) and 6 months (39 %). It is possible that highly elevated SF levels portend particularly high immediate and sub-acute mortality rates among patients with cancer, while they portend a high risk of death in only the immediate timeframe for patients with acute liver injury. This issue could be explored further in future research.

EVALUATION OF A DIAGNOSTIC CHECKLIST FOR USE IN INTERNAL MEDICINE RESIDENT EDUCATION Deborah DiNardo³; Sarah A. Tilstra⁴; Melissa McNeil²; William Follansbee²; Shanta M. Zimmer¹; Coreen Farris⁵; Silvia Mamede⁵; Henk Schmidt⁵; Amber E. Barnato¹. ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA; ³University of Pittsburgh School of Medicine, Pittsburgh, PA; ⁴University of Pittsburgh School of Medicine/Medical Center, Pittsburgh, PA; ⁵Erasmus University, Rotterdam, Netherlands; ⁶University of Pittsburgh Institute for Clinical Research Education, Pittsburgh, PA. (Tracking ID #2196645)

BACKGROUND: Flawed clinical reasoning and cognitive bias contribute to diagnostic errors. We developed a “diagnostic checklist” to promote cognitive de-biasing in internal medicine resident education using principles of reflective reasoning. The purpose of this study was to test the effect of this checklist on diagnostic accuracy and to obtain feedback from users.

METHODS: We performed a within-subjects controlled experimental evaluation of the checklist on written cases, followed by focus group interview. We invited all post-graduate 3 (PGY-3) residents at the University of Pittsburgh Medical Center (UPMC) to complete 10 clinical cases in a proctored setting in June 2014. First, we instructed residents to record the first diagnosis that came to mind after reading the case. Second, we asked them to evaluate 5 of the initial 10 cases again, using prompts from the diagnostic checklist prior to making a final diagnosis. We counterbalanced control (non-checklist) and intervention (checklist) cases using a block design. Two independent investigators scored diagnostic accuracy on the cases. We used repeated measures regression to assess the effect of checklist use on diagnostic accuracy, controlling for case complexity. Two investigators reviewed audiotapes of the structured debriefing focus groups and identified key themes related to usability and acceptability of the checklist for clinical teaching and decision making.

RESULTS: A total of 34 of 51 eligible PGY-3 residents (67 %) participated. One requested that his/her responses not be used for research; responses from the remaining 33 residents were included in the analysis. Inter-rater reliability of scoring suggested near-perfect agreement ($k=0.93$). Average diagnostic accuracy increased from 72 to 86 % with the checklist for simple cases and from 34 to 37 % for complex cases. In a random effects regression, checklist use was statistically significantly associated with improved diagnostic accuracy overall ($p=0.05$). This effect did not vary within strata of case complexity (simple vs. complex; $p=0.29$ for interaction). The dominant themes from the focus group interviews included: 1. The checklist was acceptable and understandable for use in evaluating clinical cases, 2. The tool would be most useful in real clinical settings when evaluating complicated cases, when teaching early learners, or when evaluating patients who have been handed off from other providers, and 3. Specific questions from the checklist were deemed to be particularly useful when evaluating clinical cases.

CONCLUSIONS: In this single-center study of PGY-3 internal medicine residents in the US, the use of a diagnostic checklist led to a statistically significant improvement in diagnostic accuracy on written clinical cases. Residents found the checklist to be acceptable for use, and offered valuable insights into the potential applications of the checklist in real clinical scenarios.

Diagnostic Checklist

1. What is your leading diagnosis?
 - a. What elements of the case support this diagnosis?
 - b. What elements of the case contradict this diagnosis? (Is there any discordant information?)
 - c. What elements are missing that you would expect to be present if your leading diagnosis were true?
2. What else could it be? (List alternative diagnoses, answer questions a, b, and c as you did above.)
3. How do you explain the findings of the case in terms of pathophysiology?
4. Now what is your final ranked differential diagnosis?

EVALUATION OF A PATIENT DECISION AID FOR ACUTE LOW BACK PAIN

Leigh H. Simmons²; Sarah Hewitt²; Lauren Leavitt¹; Karen R. Sepucha². ¹MGH, Boston, MA; ²Massachusetts General Hospital, Boston, MA. (Tracking ID #2200232)

BACKGROUND: Making decisions about treatment of acute low back pain (ALBP) can be challenging for clinicians and patients. Many patients have misperceptions about the utility of imaging and procedures for acute low back pain treatment. Patient decision aids (PtDAs) can help inform patients about treatment options and engage them in decisions about their health care; however, these tools have not been well-studied in acute care settings. This project evaluated an acute low back pain PtDA in three urgent care clinics.

METHODS: The before-after study had an observation or usual care phase and an intervention phase where all eligible participants received a decision aid and worksheet before seeing the provider. All patients seen at three urgent care clinics who had a complaint of low back pain were screened for eligibility. Eligible participants were surveyed 1 week and 8 weeks following their urgent care visit. The 1 week survey included items to assess patient knowledge, patient expectations for the visit, involvement in decision making, self-efficacy to manage ALBP (0–10 scale), pain (0–10 scale), and satisfaction with visit. Here, we examine whether patients in the intervention group had higher knowledge, more involvement in decision making, and higher self efficacy about management of back pain 1 week post visit.

RESULTS: For the observation group, 40/82 (RR=49 %) patients completed the 1 week survey and 34/40 (RR=85 %) completed the 8 week survey. For the intervention group, 32/80 (RR=40 %) completed the 1 week survey and 19/32 (RR=59 %) completed the 8 week survey. In the intervention group, 88 % (28/32) reported receiving the PtDA and 50 % (16/32) reported reviewing “most” or “all” of the DVD and/or booklet. The groups did not differ significantly in any demographic characteristic, on average the sample was 44 years old, gender (54 % female), race (58 % White), and employment (76 % fulltime). The majority of patients in both groups had tried “bed rest” (83 %) and OTC pain medicine (75 %) before their visit. When asked about their expectations for the initial visit, the majority of patients in both groups indicated it was very or extremely important to understand what is happening with the back (95 and 91 %, $p=0.21$), to receive a clear diagnosis for the pain (88 and 88 %, $p=0.70$) and to get reassurance that pain was not caused by something serious (85 and 88 %, $p=0.33$). Fewer patients in the observation group indicated it was very or extremely important to get a referral to a specialist (20 % vs. 47 %, $p=0.03$) or have imaging (20 % vs. 44 %, $p=0.05$) compared to the intervention group. There were no statistically significant differences between the observation and control groups on the main outcomes. The mean knowledge scores were 55.5 % for observation and 52 % for intervention ($p=0.85$). Across both groups, only about half of patients (57 %) understood that doing normal activities is not likely to hurt their back. About half (49 %) also understood that it was very unlikely that there was a serious cause (such as cancer) for most acute low back pain. Most patients received a diagnosis during the visit (88 % of observation group and 69 % of intervention group, $p=0.46$). Most patients also reported that their health care provider explained options to manage back pain (83 and 75 %, $p=0.26$). More than half of the patients reported that the health care provider asked for their preference about management of back pain (58 % of observation and 69 % of intervention, $p=0.34$). At 1 week, mean self-efficacy scores were 7.3/10 and 7/10 ($p=0.49$) and mean pain scale scores were 4.5/10 and 4.85/10 ($p=0.55$) for the observation and intervention groups, respectively. Many

patients were “very satisfied” with the care they received at the visit (63 % observation and 47 % intervention, $p=0.2$).

CONCLUSIONS: Patients seeking urgent care for ALBP had considerable gaps in their knowledge, but did report high self-efficacy. Contrary to the hypotheses, the PtDA did not have an impact on knowledge or self efficacy. Though the PtDA distribution intervention was well-received by office staff, the PtDA was only reviewed by half of the patients. Different approaches may be needed to ensure informed decisions for ALBP in the urgent care setting.

EVALUATION OF DISCORDANT UPPER ENDOSCOPY IN OUTPATIENTS WITH GASTROESOPHAGEAL REFLUX DISORDER Jennifer X. Cai¹; Emily J. Campbell²; James M. Richter². ¹Johns Hopkins Hospital, Baltimore, MD; ²Massachusetts General Hospital, Boston, MA. (Tracking ID #2199270)

BACKGROUND: Upper endoscopy has become widely used for the diagnosis and management of gastroesophageal reflux (GERD) and low-risk dyspepsia. In a recent study that sampled 5 % of Medicare beneficiaries, one in three individuals who received an esophagogastroduodenoscopy (EGD) had a repeated procedure within 3 years and 43 % of repeated EGDs were done in patients who did not have a diagnosis at index or on repeat exam that justified the additional procedure. Both the Choosing Wisely campaign and the American College of Physicians (ACP) advocate for appropriate use of upper endoscopy in the setting of GERD and low-risk dyspepsia. No studies to date have examined rates of concordance with current best practice guidelines in the treatment of these two common indications. We aim to measure the appropriate use of upper endoscopy in patients with GERD, low-risk dyspepsia and related diagnoses and to compare these rates across types of providers and indications.

METHODS: A retrospective chart review was performed of all consecutive outpatients who underwent an upper endoscopy between September and December 2013 for GERD, dyspepsia, esophagitis, and Barrett's esophagus. Based on ACP best practice guidelines, appropriate indications for endoscopy included patients with 1) non-dysplastic Barrett's esophagus who did not receive an EGD within the last 3 years for surveillance, 2) acute symptoms (<5 years) that persist despite a therapeutic trial of 4-8 weeks of twice-daily proton-pump inhibitor (PPI) therapy, 3) chronic symptoms (>5 years) who are male and greater than 50 years of age, 4) alarm symptoms (dysphagia, bleeding, anemia, weight loss, or recurrent vomiting), and 5) severe erosive esophagitis (grade B or worse) after 2 months of PPI therapy.

RESULTS: A total of 550 upper endoscopies were identified and included in the study, of which 37.8 % ($n=208$) were discordant with current guidelines. Among procedures referred by primary care, 39.4 % ($n=161$) were discordant with guidelines whereas among those endoscopies initiated by gastroenterologists, 33.3 % ($n=47$) were discordant ($P=0.20$). Nearly 50 % of all procedures referred for Barrett's esophagus and chronic reflux symptoms were found to be discordant with guidelines (Table 1). In contrast, less than 2 % of procedures referred for alarm symptoms were discordant. Reasons for discordance included an inadequate trial of PPI therapy prior to endoscopy (30.3 %, $n=63$), frequent surveillance for non-dysplastic Barrett's esophagus within 3 years (28.4 %, $n=59$), chronic reflux symptoms in females (19.2 %, $n=40$), and chronic symptoms in patients under 50 years of age (9.6 %, $n=20$). Among all patients in the study, 22.5 % ($n=124$) had more than one upper endoscopy within the last 3 years.

CONCLUSIONS: A large proportion of EGDs performed for GERD and low-risk dyspepsia in the outpatient setting are discordant with current best practice guidelines, with nearly one-fourth receiving a repeat upper endoscopy within the last 3 years. An inadequate PPI trial, premature Barrett's esophagus surveillance, age less than 50, and female gender were the most common reasons for discordance. This study highlights an opportunity for a multidisciplinary approach to quality improvement including physician and patient education and specialist pre-review of primary care referrals.

Table 1. Overall frequency and proportion of procedures found to be discordant with guidelines by indication

Indication	Frequency (N)	Discordance rate (N)	P-value
Barrett's esophagus	21.1 (116)	49.1 (57)	0.005
Acute symptoms	44.2 (243)	25.5 (62)	<0.0001
Chronic symptoms	41.8 (230)	47.0 (108)	<0.0001
Alarm symptoms	30.7 (169)	1.78 (3)	<0.0001
Severe esophagitis	2.91 (16)	37.5 (6)	0.979

EVIDENCE-BASED QUALITY IMPROVEMENT IN A VA WOMEN'S HEALTH PRACTICE BASED RESEARCH NETWORK Karen M. Goldstein¹; Susan M. Frayne^{5, 6}; Jennifer Gierisch¹; Jill Blakeney¹³; Elizabeth M. Yano^{4, 7}; Anne Sadler^{8, 9}; Bevanne Bean-Mayberry^{4, 7}; Diane Carney⁵; Brooke DiLeone¹⁰; Annie Fox¹¹; Ruth Klap⁴; Alison Hamilton³; Ellen Yee²; Dawne Vogt^{11, 12}. ¹Durham VA; ²Duke University, Durham, NC; ³NMVAHCS, Albuquerque, NM; ⁴US Department of Veterans Affairs, Los Angeles, CA; ⁵VA Greater Los Angeles HSR&D Center, Sepulveda, CA; ⁶VA Palo Alto Health Care System, Menlo Park, CA; ⁷Stanford University, Palo Alto, CA; ⁸UCLA, Los Angeles, CA; ⁹Department of Veterans Affairs, Iowa City, IA; ¹⁰University of Iowa, Iowa City, IA; ¹¹Philadelphia VAMC, Philadelphia, PA; ¹²VA Boston Medical Center, Boston, MA; ¹³Boston University, Boston, MA; ¹⁴Durham VAMC, Durham, NC. (Tracking ID #2194776)

BACKGROUND: Most research evidence fails to change clinical care, in part due to the gap between strictly standardized research settings and the variable conditions at the bedside. Practice based research networks (PBRNs) were developed as a mechanism for conducting research in ‘real world’ settings and to bring research findings to busy clinicians. Evidence-based quality improvement (EBQI) can be an effective strategy to accelerate implementation of clinical trial findings into routine clinical practice through use of existing research findings, employment of multi-level clinical and administrative engagement, and capitalizing on productive research-clinical partnerships. Practice based research networks (PBRNs) are a promising setting for EBQI because they amplify the impact of successful outcomes by multiplying efforts across different sites and afford an opportunity to study implementation variations by serving as a “community laboratory”. To date, little has been described about the experience of EBQI in the PBRN setting. We conducted a multi-site cluster randomized trial in the recently created VA-based Women's Health PBRN (WH-PBRN) to test EBQI as a strategy to identify site specific implementation approaches of an enhanced gender awareness training targeted to VA providers and staff. We describe the barriers to and facilitators of the EBQI approach in this nascent PBRN setting.

METHODS: This EBQI project was conducted at the four geographically diverse, inaugural sites in the WH-PBRN. The training implemented was *Caring for Women Veterans (CWV)*, a 30 min on-line, interactive, evidence-based training program designed to target gender awareness among VA employees. The EBQI approach included local expert panels to identify site-specific needs, tailoring of the local training delivery plan, and identification of local “owners” to carry out the adapted training plan to selected clinical workgroups at each facility. We used the Replicating Effective Programs (REP) conceptual framework, previously described in the context of implementation, to identify PBRN-specific barriers and facilitators of the EBQI approach. We collected information about perceived barriers and facilitators in two ways. First, themes were informally noted during the course of the EBQI activities and again during post-EBQI intervention debriefing calls. Then, after the completion of EBQI activities, each site was asked to identify barriers to and facilitators of EBQI activities across the four phases of the REP framework (i.e. *pre-conditions, pre-implementation, implementation, and maintenance/evolution*). Notes from the debriefing calls and the targeted REP phase-based survey were reviewed and consolidated into summary findings, which were then shared with the four Site Leads for further revision and clarification.

RESULTS: Four hundred, forty-two employees received the gender sensitivity training across the four sites. The PBRN impacted the EBQI process in multiple ways. Specific facilitators were noted, such as marked facility leadership support across sites reinforced by common institutional values, opportunities to capitalize on common resources and efforts across sites, the ability for timely sharing of project experiences among site participants, and the use of the PBRN coordinating center support for managing multi-site EBQI complexities. Noted barriers included differences in site timelines due to staffing turnover and variable local resources for completing project activities.

CONCLUSIONS: PBRNs offer specific advantages for multi-site EBQI projects and represent a promising pathway for speeding the translation of research findings into everyday practice through the approximation of primary care teams and their research partners. Lessons learned from our multi-site cluster randomized trial of EBQI will impact strategies for the wider dissemination of the CWV gender awareness curriculum within the VA setting and inform future PBRN-based EBQI projects.

EXAMINING GENDER DIFFERENCES IN CARDIOVASCULAR DISEASE RISK FACTORS AMONG LOW-INCOME DIABETIC PATIENTS Rosette J. Chakkalakal²; Russell L. Rothman¹. ¹Vanderbilt, Nashville, TN; ²Vanderbilt University, Nashville, TN. (Tracking ID #2199275)

BACKGROUND: A diagnosis of diabetes increases the risk of cardiovascular disease (CVD) to a greater extent in women than in men. Prior research suggests this disparity is

largely mediated by gender differences in the prevalence and/or management of major CVD risk factors, such as body mass index (BMI), systolic blood pressure (SBP), and LDL cholesterol. It is unknown if gender differences in these CVD risk factors are also present in low-income diabetic populations. The purpose of this project was to compare demographic characteristics, type 2 diabetes (T2DM) related characteristics, and major CVD risk factors between low-income men and women with T2DM.

METHODS: The PRIDE study (Public Private Partnership Addressing Literacy-Numeracy to Improve Diabetes Care) is a cluster-randomized trial designed to assess the efficacy of a low-literacy/numeracy-oriented intervention to improve T2DM care in Tennessee Department of Health “safety-net” primary care clinics. Using PRIDE enrollment data, we conducted a cross-sectional observational study to compare demographic characteristics, T2DM-related characteristics, and major CVD risk factors between male and female study participants. Categorical variables were analyzed using Chi-square test or Fisher’s exact test; continuous variables were analyzed using *t*-test. Demographic characteristics included age, race, ethnicity, and income. T2DM-related characteristics included duration of T2DM, use of oral antidiabetic medications, use of insulin, hemoglobin A1C, health numeracy, and diabetes self-efficacy. Numeracy was assessed using the 5-item Diabetes Numeracy Test (DNT-5) and reported as the percentage of correct answers. Diabetes self-efficacy was assessed using the Perceived Diabetes Self-Management Scale (PDSMS). Major CVD risk factors included tobacco use, SBP, LDL cholesterol, and BMI.

RESULTS: The study sample included 248 women (60.49 %) and 162 men (39.51 %). Female participants reported a significantly longer duration of T2DM (9.62 ± 7.14 years versus 7.87 ± 6.76 years, $p=0.01$) and significantly lower diabetes self-efficacy (PDSMS score of 24.08 ± 5.63 versus 25.50 ± 5.84 , $p=0.01$) compared to male participants. There were no other significant gender differences in demographic characteristics, T2DM-related characteristics, or major CVD risk factors in the study sample (Table 1).

CONCLUSIONS: In this low-income sample of men and women with T2DM, there were no significant gender differences in major CVD risk factors but women had significantly lower diabetes self-efficacy relative to men. Greater diabetes self-efficacy has previously been found to be associated with improved glycemic control. Thus, our findings suggest that diabetes self-efficacy may be an additional contributing factor to gender disparities in CVD among diabetics, particularly for low-income populations, and should be included in future evaluations of this topic.

Gender Differences in Demographic Characteristics, T2DM-Related Characteristics, and Major CVD Risk Factors among PRIDE Participants

	Women (n=248) Mean±SD or % (n)	Men (n=162) Mean±SD or % (n)	p-value*
Demographic Characteristics			
Age	49.75±9.62	49.33±9.21	0.66
Hispanic ethnicity	25.00 (62)	22.22 (36)	0.52
Race			0.60
White	62.50 (155)	64.20 (104)	
Black	16.53 (41)	19.14 (31)	
Income			0.29
<\$10,000	53.63 (133)	52.47 (85)	
≥\$10,000	45.16 (112)	46.91 (76)	
T2DM-Related Characteristics			
Years with T2DM	9.62±7.14	7.87±6.76	0.01
Oral medications	90.32 (224)	86.42 (140)	0.29
Insulin	59.27 (147)	59.26 (96)	0.92
Hemoglobin A1C	9.44±1.94	9.82±2.26	0.07
DNT-5 (% correct)	45.93±37.67	46.58±37.32	0.87
PDSMS	24.08±5.63	25.50±5.84	0.01
Major CVD Risk Factors			
Tobacco Use	27.42 (68)	29.63 (48)	0.59
SBP	132.03±20.26	134.89±19.12	0.16
LDL	102.29±37.09	99.13±38.74	0.45
BMI	36.20±8.90	35.25±9.04	0.30

*p-value for Chi-square, Fisher’s exact test, or *t*-test as indicated.

EXAMINING THE DIFFERENCE BETWEEN INTERACTIVE VOICE RESPONSE SYSTEM VS. PHARMACIST-CAPTURED PATIENT SYMPTOMS FOR ADVERSE DRUG EVENTS SCREENING Jeffrey Medoff³, Japneet Kwatra³, Elissa V. Klinger², Alejandra Salazar³, Lucas Marinacci³, Jennifer Haas¹, Patricia C. Dkyes⁴, David W. Bates², Gordon D. Schiff³. ¹BWH, Boston, MA; ²Brigham and Women, Boston, MA; ³Brigham and Women’s Hospital, Boston, MA; ⁴bwh, Sudbury, MA. (Tracking ID #2200259)

BACKGROUND: Interactive Voice Recognition Systems (IVRS) offer the potential for providing automated, efficient feedback from patients. IVRS platforms are capable of reaching out in a cost-efficient manner to large numbers of patients and can query patients via telephone to collect responses that can be used to assess the quality of care and identify potential problems. IVRS may be especially useful when coupled with real-time handoffs to a live person who can respond to problems identified, assist with treatment, and refer cases in need of further attention to appropriate care or follow-up. Ideally, both IVRS and live clinicians should obtain congruent information from the patient. However discrepancies may exist between patient-reported symptoms to an IVRS versus what is reported in live conversation. Such discrepancies raise questions about the limitations of the effectiveness of an IVRS platform in evaluating patient health. This analysis examines the most commonly reported symptoms captured via IVRS versus those reported to a pharmacist subsequently conversing with the patient via phone screening for detection of potential adverse drug reaction (ADR) symptoms.

METHODS: We recruited patients identified as newly starting oral medications to treat one of four common conditions (depression, insomnia, hypertension and diabetes) in a primary care clinic. Eligible patients were mailed advance information letters, with an option to opt-out from receiving the IVRS call. Eligible patients were then called using IVRS and asked questions regarding adherence and a series of 25 symptoms possibly associated with their new medication. All calls in which symptoms were reported were on completion of the IVRS screen immediately transferred to a clinical pharmacist. Participants could also choose to be transferred without a positive screen if they had any questions or concerns about their medication. The patient-pharmacist phone encounter assessed reported or any other medication related symptoms, and was documented in a clinical note in the patient’s electronic health record (EHR). If a positive IVRS screen participant was not successfully transferred from the IVRS to the pharmacist, study staff attempted to manually contact the participant and review their survey results.

RESULTS: Of a total of 4847 patients called, 609 patients (12.6 %) completed the IVRS calls. Of that number, 306 (50.2 %) reported at least 1 possible side effect on the IVRS call. In total, 808 symptoms were reported to the IVRS and 704 symptoms were reported to the pharmacist. The pharmacist noted 41 symptoms (5.8 % of total number of symptoms reported to the pharmacist) that were not solicited by the IVRS tool. Table 1 compares the most commonly reported symptoms on IVRS and with the live pharmacist.

CONCLUSIONS: While the frequency of symptoms reported to the IVRS versus to a live pharmacist was similar, notable differences included frequency of gastrointestinal problems including stomach problems, diarrhea, and weight gain. Interestingly, sexual function problems and memory issues/confusion were also reported roughly 2 % less to the (female) pharmacist than to the IVRS. On the other hand, other symptoms were captured only by the pharmacist encounter, largely because they were not included as structured fields in the IVRS survey. Ideally, a standalone IVRS platform could be sufficiently reliable to screen for symptoms without requiring unnecessary redundant confirmation by a live pharmacist. However a parsimonious, limited number of questions may miss significant patient complaints not covered in the structured screening questions. The trade-off of a short, streamlined survey is that that it may diminish ability to detect less common symptoms. In this study, live pharmacist involvement resulted in detection of additional issues that patients felt needed to be addressed.

Most Frequent Reported Symptoms (IVR and Pharmacist)

Top Symptoms IVR	Times Reported IVR (N=808)	Top Symptoms Pharmacist	Times Reported Pharmacist (N=704)
Fatigue/Tiredness	85 (10.5 %)	Fatigue/Tiredness	84 (11.9 %)
Muscle Aches	81 (10.0 %)	Muscle Aches	78 (11.1 %)
Dizziness/Balance	71 (8.8 %)	Headaches	62 (8.8 %)
Issues			
Headaches	65 (8.0 %)	Dizziness/Balance	59 (8.4 %)
Lost Weight	56 (6.9 %)	Issues	
Stomach Problems	51 (6.3 %)	Gained Weight	52 (7.4 %)
Sexual Function	42 (5.2 %)	Lost Weight	41 (5.8 %)
Memory Issues/	42 (5.2 %)	Other	41 (5.8 %)
Confusion		Difficulty Sleeping	28 (3.9 %)
Diarrhea	28 (3.5 %)	Memory Issues/	25 (3.6 %)
		Confusion	
Difficulty Sleeping	27 (3.3 %)	Sexual Function	24 (3.4 %)

EXPERIENCES OF PRIMARY CARE PHYSICIANS RESPONDING TO POINT-OF-CARE PRICE INFORMATION Katherine Schiavoni¹; Lisa S. Lehmann²; Wen Guan¹; Meredith Rosenthal⁵; Thomas D. Sequist³; Alyna T. Chien^{1,4}. ¹Boston Children's Hospital, Boston, MA; ²Brigham and Women, Boston, MA; ³Partners Healthcare System, Boston, MA; ⁴Harvard Medical School, Boston, MA; ⁵Harvard School of Public Health, Boston, MA. (Tracking ID #2197741)

BACKGROUND: Physicians are targets of price transparency initiatives because they play a central role in ordering tests and lack knowledge regarding health care prices. Prior investigations tend to study trainees in inpatient settings after short-term price information exposure; very little is known about how ongoing price information affects frontline primary care physicians (PCPs) in outpatient practice. We qualitatively study PCPs who began receiving median paid price information for commonly-ordered outpatient imaging tests (e.g., colonoscopies, MRIs) in January 2014. As part of a larger study, a random two-thirds of these PCPs additionally received this price information whenever placing orders within their electronic health record.

METHODS: After 9 months of price information exposure, we recruited on average 3 PCPs from 15 practice locations within a single large multi-specialty group in Massachusetts. Forty-six PCPs participated in 30-min audio-recorded semi-structured interviews in which they were asked to describe: (a) their gut reaction to having price information, (b) how having price information affected the nature of their clinical decision-making or conversations with patients, and (c) the degree to which they felt professionally obligated to deliver care that was aligned with patient, organizational, or societal goals. We used the constant comparative method of qualitative analysis; two primary readers independently coded interview transcripts using Dedoose software; we adjudicated differences through discussion.

RESULTS: Data analysis is ongoing. Among our interviewees, 27 (57 %) were female, had completed residency an average of 22 years ago (SD 10, range 3–43), and 31 (67 %) were engaged in direct patient care for 3–5 days per week. Two-thirds viewed the introduction of price information as a positive change for their clinical practice, while most of the remaining one-third were ambivalent. The few who viewed the change negatively mainly described feeling ill-trained to use the information. For clinical decision-making, more than half reported using price information as a reminder to check themselves about whether an order was truly clinically indicated; few reported actually changing ordering practices (e.g., no alternative test available, clinical decision had been made prior to receiving price information). For patient conversations, three-quarters described price information being useful for responding to patient inquiries about price, but most stated that the initiative did not go far enough because it did not provide individual patients' out-of-pocket price. The two most frequently described sources of conflicting professional obligations arose from patients requesting tests that were not clinically indicated and from patients not being able to afford clinically indicated tests; having price information was not considered to be useful in the former scenario, but occasionally helpful in the latter.

CONCLUSIONS: Seasoned primary care physicians active in outpatient care can welcome the availability of price information. However, their reports suggest that this information is more helpful in assisting patients with their out-of-pocket spending needs than in clinical decision-making. More deliberate guidance for physicians on how to use price information may be needed to avoid or mitigate negative physician experiences or change ordering practices; additional training may be particularly helpful for negotiating situations in which professional obligations compete.

EXPLORING BEHAVIOURS OF JOURNAL AUTHORS AND EDITORS Jason R. Kerr¹; David Moher³; Sharon Straus². ¹University of Toronto, Toronto, ON, Canada; ²Li Ka Shing knowledge institute of St Michael's, University of Toronto, Toronto, ON, Canada; ³Ottawa Hospital Research Institute, Ottawa, ON, Canada. (Tracking ID #2189999)

BACKGROUND: Adhering to appropriate ethical and professional standards when conducting research is essential for researchers. Similarly, those responsible for disseminating the results of research, including authors and journal editors, should maintain the highest ethical standards to ensure that the published record is an accurate, transparent, and reproducible account of what was done (methods) and found (results). While a body of literature exists on the nature and frequency of professional misconduct by authors, less information is available on the ethical behaviours of journals and journal editors. Our investigation is aimed at addressing this gap in the literature, specifically by exploring the experience, prevalence, and perception of unprofessional conduct in publication from the authors' perspective.

METHODS: Corresponding authors on articles published between January 1st, 2013 and June 30th, 2013 from the five peer-reviewed general medical journals with the highest Thomson impact factors were identified. Corresponding authors from articles published during the same time frame from randomly selected medical journals on Beall's list of 'predatory journals' were also identified. An online survey consisting of 30 questions about perceived unethical behaviour on the part of both journals and authors was sent to each of the authors via e-mail, with subsequent e-mail and fax reminders.

RESULTS: Four hundred thirty-two authors were identified from the five medical journals with the highest Thomson impact factors. One hundred ninety-nine authors were identified from the five predatory journals. The survey response rate from the impact factor (IF) journal authors was 19.7 % (85/432). The survey response rate for the predatory journal (PRED) authors was 8.0 % (16/199). 78.8 and 50.0 % of the IF authors and PRED authors, respectively, had published at least 11 manuscripts in peer-reviewed journals over the past 3 years. The most prevalent behaviours from the IF authors' perspective can be found in Table 1. From the PRED journal authors' perspective, the most common journal behaviour was taking too much time between submission of the manuscript and decision on acceptance or rejection (81.3 %, 13/16 authors) and the most common author behaviour was submitting the same manuscript with minimal changes to another journal after a rejection (75.0 %, 12/16 authors). The largest differences in journal-based behaviour between the IF and PRED groups were for having a journal accept a manuscript, only to state later on that it would be published in a lesser known sister journal (7.1 % vs. 37.5 %, respectively) and having a manuscript reviewed by someone without expertise in the field of study (57.65 % vs. 12.5 %, respectively). The largest differences in author-based behaviour between the IF and PRED groups were including authors on a manuscript even though they did not contribute significantly to the work in exchange for inclusion on one of their manuscripts (7.1 % vs. 37.5 %, respectively) and adding references to a manuscript that were not relevant in order to improve the chances of acceptance (14.1 % vs. 6.3 %, respectively).

CONCLUSIONS: This study is the first to identify the experience of authors in the peer-review process with respect to perceived unethical behaviours on the parts of both authors and journal editors. This study shows that unethical behaviour in the medical literature is perceived to be common by authors who have published in highly-regarded journals as well as authors who have published in predatory journals, with the most prevalent issues arising during the peer-review process. These findings illustrate the need for more stringent regulations around peer-review to ensure that the process is fair and equitable for authors, editors, and peer reviewers.

Most prevalent findings for impact factor journal authors

Behaviour / situation	Number of authors indicating behaviour (out of 85)	Percentage of authors indicating behaviour	Mean number of instances per author
Excessive time taken between manuscript submission and decision to publish or not	65	76.5 %	8.4
Reviewer of manuscript did not fully understand the content	64	75.3 %	7.3
Reviewer did not have sufficient expertise in subject matter of manuscript	49	57.6 %	9.5
Manuscript was accepted or rejected contrary to all comments from peer reviewers	25	29.4 %	6.9
Manuscript rejected by a journal followed by a manuscript with very similar content published soon after in the same journal	24	28.2 %	1.79
Perceived selection of peer reviewers by a journal based on their bias either for or against an author	19	22.3 %	3.37
Suspicion that a reviewer has stolen a manuscript idea after reviewing it negatively for a journal	14	16.5 %	2.46

EXPLORING MEDICAL STUDENT'S PERSPECTIVES REGARDING INSTRUCTION ON THE RECOGNITION AND MANAGEMENT OF RACIAL AND ETHNIC IMPLICIT BIAS Cristina M. Gonzalez¹; Maria L. Deno³; Emily Kintzer³; Diane McKee¹; Paul R. Marantz². ¹Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY; ²Albert Einstein College of Medicine, Bronx, NY; ³Albert Einstein College of Medicine, Bronx, NY. (Tracking ID #2194180)

BACKGROUND: Evidence suggests that individual physicians' actions contribute to disparities in health. Some disparities in clinical practice may be due to implicit (subconscious) bias rather than explicit (conscious) bias. Implicit bias can impact clinical decision-making and could therefore contribute to healthcare disparities. A curriculum on recognition and management of implicit bias may mitigate individual provider contributions to healthcare disparities. To our knowledge, no curricula are published for medical students, our future physicians. A curriculum addressing racial and ethnic implicit bias will require discussions that are potentially emotionally charged. To enhance student engagement in the eventual curriculum, our study explores medical students' perceptions of challenges and opportunities when participating in instruction in implicit bias recognition and management in clinical encounters.

METHODS: We conducted focus group interviews with students at Albert Einstein College of Medicine, in Bronx NY, using convenience and snowball sampling. Focus groups were conducted until saturation of themes was achieved. Research assistants conducted the focus groups using a semi-structured interview guide. They were digitally recorded and professionally transcribed. Qualitative analysis was performed using grounded theory. Two investigators independently analyzed two transcripts and created a list of codes, which were applied to two other transcripts to refine and finalize the codebook. Any disputes in coding were resolved through consensus, with a third party available when needed.

RESULTS: Eleven focus groups were conducted with a total of 56 participants representing every class. Some students had participated in implicit bias exercises previously. Three major themes emerged in the data analysis: obstacles to engagement in instruction, challenges in the clinical years, and facilitation of the instructional sessions. OBSTACLES TO ENGAGEMENT were identified even by the students who believed learning about implicit bias is important. Students feared the consequences of discovering that some of their behaviors may not coincide with the egalitarian values they espouse. *"I think I'd be frustrated with myself, ... and I think I would also just feel horrible for the people that are affected...So I think that would be like an internal battle for me."* Many did not trust that conversations would remain confidential. *"There definitely needs to be an element of confidentiality because, I mean, we're all going to be each other's colleagues. I don't want to be the neighborhood ophthalmologist who's the racist the everybody remembers from med school."* Socially desirable answers might result, with no real personal growth. *"In my class, people expounded more on what they thought people wanted to hear, which was oh, I did really well on the [implicit bias] test...here's one example of when my patients was like this and the attending said one thing, and I said 'No, that's wrong.' So I think people wanted to reinforce with each other that they were not being racist or biased."* Students often agreed that instruction needed to move beyond awareness of implicit bias into skill building to manage their biases when providing patient care. Developing these skills could lead to unanticipated challenges in the clinical years. *"I think the worst feeling is hearing someone else say something racist or biased and not feeling like you can tell them that wasn't OK ...and feeling trapped in that position is really tough."* *"I think the challenge is that it's difficult to bring it up to the attending because you don't know if this is wrong or if this is the way that it is in a teaching hospital."* Students identified opportunities to improve the quality of the FACILITATION OF THE INSTRUCTIONAL SESSIONS and provided several suggestions for innovative teaching strategies. *"Fourth years are very close to the way we feel, but then they've had really rich experiences in their third years and through their sub-Is. So they have this wealth of knowledge that we don't have yet, but at the same time, they still feel very relatable, and I don't feel scared being like, 'Oh, is this person going to affect my grade somehow?'... Something feels more comfortable with that."* Students suggested easing into racial bias as a teaching strategy to encourage buy-in from more resistant students. *"So using those things, which are not charged and sensitive would be a good way to be like, 'oh wow I do have these biases' and slowly transition over to more charged subjects like these [racial and ethnic bias]."*

CONCLUSIONS: Medical student volunteers identified obstacles to instruction on implicit bias recognition and management, and potential challenges in applying skills. Their concerns must be addressed in the curriculum to ensure safety, confidentiality, and foster open and honest student engagement. Their insights will inform future curriculum development and recruitment and training of facilitators.

EXPLORING PATIENT'S PERCEPTIONS OF RACIAL AND ETHNIC BIAS IN MEDICAL ENCOUNTERS Cristina M. Gonzalez¹; Maria L. Deno²; Emily Kintzer²;

Diane McKee¹; Paul R. Marantz². ¹Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY; ²Albert Einstein College of Medicine, Bronx, NY. (Tracking ID #2194173)

BACKGROUND: Evidence suggests that some physicians' clinical choices vary based on their patient's race or ethnicity. Such differences are referred to as within provider disparities and have been documented in clinical settings. These differences are less often the result of overt racism (explicit bias) than of subconscious assumptions (implicit bias). Evidence suggests that implicit bias impacts clinical decision-making and could therefore contribute to healthcare disparities. A curriculum on recognition and management of implicit bias may mitigate individual provider's contributions to healthcare disparities. As part of a targeted needs assessment to inform the eventual curriculum, the objective of our study is to explore patients' perspectives of bias in medical encounters and their lived experiences of discrimination, and solicit their suggestions for steps to eliminate this perceived bias in medical encounters.

METHODS: Eligible participants had sought medical care as a patient themselves or for their children at least once in the last year and lived in or worked in New York. Purposive sampling was employed to enroll Latino (US and non-US born) and Black (African American, African, and Caribbean) participants spanning the socioeconomic spectrum (SES) spectrum in New York City. Focus groups were conducted in English and Spanish using a semi-structured interview guide, were digitally recorded, and professionally transcribed. Standard qualitative analysis of the transcripts was performed using grounded theory. Two investigators independently analyzed two transcripts and generated a list of codes, which were applied to two other transcripts to refine and finalize the codebook. The remaining transcripts were analyzed independently by two members of the investigative team. Any disputes in coding were resolved through discussion, with a third party available when consensus could not be reached. Demographic data were collected. Focus groups were conducted until qualitative analysis revealed that saturation of themes had been reached.

RESULTS: We conducted 10 patient focus groups, 6 in English and 4 in Spanish, with a total of 74 participants. Demographic data demonstrated successful sampling across the SES. Four major themes emerged from the data analysis: participants' perceptions of 1) feeling dismissed; 2) feeling empowered versus feeling powerless; 3) the consequences of privilege and the lack of privilege; and 4) the effects of being the recipient of discrimination. Patients recounted several instances of feeling dismissed ranging from the staff at the front desk, through their encounter with their physician. *"She was a doctor- and... she yanked off the first snap on the left leg. So I'm thinking, like I'm human. She was courteous to that [White] lady and I've got just as much age as her. I qualify on the level and scale of human being as her, but I didn't feel that from that doctor."* Patients' levels of feeling empowered versus feeling powerless varied according to personal characteristics, such as immigration status. *"This is the doctor and I am African, I would be like, 'Okay, do not ask him that question or he will not treat your child well.' I be like swallow. I go with it."* Patients discussed the consequences of privilege and the lack of privilege. Several participants recounted the feeling of losing privilege when judged solely on their external appearance. *"They put me sort of in the corner and I can't talk very well because I can't breathe so well. The nurse comes over to me and actually says, 'Tu tiene tu Medicaid?' I whispered out, 'I'm a doctor' in perfect English. Within two minutes there was an entire orthopedic team around me...I kept wondering about what if I hadn't been a doctor, you know? Pretty eye opening and very sad."* Participants commonly experienced discrimination in their daily lives and developed mechanisms to compensate for it when seeking medical care. *"You need a doctor. That's why you tolerate it. As I told you, I go in a very nice way in order to get the same response from them [as compared to a White patient]. And I practically make a face, like a sad face, to get them to feel pity for me and to get treated well and to avoid conflict. Because if not, I will lose."*

CONCLUSIONS: The potential implicit biases of providers interact with racial or ethnic minority patients' sensitivity to possible cues of bias to jointly influence the outcomes of clinical care. Patients identified several provider behaviors that led them to perceive bias in their medical encounters. Patients enter these encounters in the context of their daily lived experience, including experiencing discrimination that may influence their perceptions of clinical care. Our patients' insights as well as their suggestions on how to mitigate the effects of bias will inform a curriculum in the recognition and management of implicit bias in medical encounters for medical students and practicing physicians, and may potentially be applicable to all staff.

EXPOSURE TO FICTIONAL MEDICAL TELEVISION AND HEALTH: A SYSTEMATIC REVIEW Beth Hoffman; Ariel Shensa; Charles B. Wessel; Brian A. Primack. University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2198783)

BACKGROUND: This year marks the 20th anniversary of the premiere of *ER* and *Chicago Hope*, which ushered in a distinct, new era of fictional medical television. At

its peak, *ER* attracted over 30 million viewers per week, and current fictional medical television programs such as *Grey's Anatomy* continue to draw over 10 million viewers each week. The average American adult spends only an hour in an actual physician's office each year, but he or she watches about 2000 h of television each year. Therefore, these programs may impart knowledge about public health topics, shape patients' perceptions of health and health care, and even alter health behaviors known to be related to leading causes of death and disease. As a result, some researchers have assessed associations between exposure to fictional medical television and health related factors. However, there has yet to be a systematic review of this literature in order to synthesize extant research and make recommendations for future study. This review aims to fill that gap.

METHODS: We conducted systematic literature searches in three databases: Medline, Ovid CINAHL and Ovid PsychINFO. Search strategies were developed under the guidance of a professional research librarian. Reference lists of articles found through the database searches were examined to identify additional relevant articles. Selected studies had (1) to be published in a peer-reviewed journal, (2) to be related to a fictionalized medical television program taking place primarily in a health-related setting, and (3) to assess viewers' health related knowledge, perceptions, and/or behaviors. In light of critical consensus supporting the 1994 premiere of *ER* and *Chicago Hope* as marking a new era of fictional medical television, we also restricted selected studies to those published in the past 20 years. Studies were classified according to (1) participant factors such as age and sex, (2) exposure-related factors such as the specific program studied and the dose of exposure, (3) outcome-related factors such as whether perceptions, knowledge, and/or behaviors were assessed, and (4) study quality.

RESULTS: Of 1422 articles identified, 24 articles met criteria for selection. One-third (33 %) studied participants in the 18–24 age range (college undergraduates). No studies assessed participants ages 65 and up. Only one study assessed differences among individuals of different racial and ethnic backgrounds (e.g., Caucasian, Latino, African-American). The most commonly assessed programs were *ER* (54 %), *Grey's Anatomy* (42 %), and *House M.D.* (25 %). Studies examined the association of program exposure with health-related perceptions (71 %), knowledge (42 %), and behaviors (42 %). Of studies examining knowledge or perceptions, the most popular health topics were organ donation (33 %), cancer (17 %), alcohol (11 %), and sexually transmitted infections (11 %). The most common behaviors studied were having discussions about health with friends or family (40 %), and/or consulting a physician (40 %). The majority of these behavior studies (70 %) found a positive association between viewership and health behavior. No studies assessed longitudinal associations more than 2 months. Most studies were of fair to poor quality in terms of rigor of study design.

CONCLUSIONS: Fictional medical television may provide a variety of health-related knowledge. These programs may also influence health-related perceptions, knowledge, and/or behaviors. However, the vast majority of work previously conducted in this area has been cross-sectional or very short-term and thereby limited in its ability to assess influence. Considering the importance of health disparities and the lack of studies in this area focusing on minority populations, this would also be an important area for future work. While most work in this area has focused on associations between programming and high-interest topics such as organ donation and sexually-transmitted infections, a small minority addressed the potential for this medium to influence health behaviors more closely related to morbidity and mortality such as tobacco use and diet and exercise patterns. It would be valuable for future work to utilize more rigorous study designs and to assess the potential to leverage this large exposure to influence health behaviors other than discussion of information and/or consultation with a physician.

FACILITATORS OF TEAM FUNCTIONING DURING THE EARLY STAGES OF PCMH IMPLEMENTATION Karleen Giannitrapani⁴; Alexis K. Huynh⁶; Andrew Lanto⁵; Susan E. Stockdale²; Lisa S. Meredith³; Lisa V. Rubenstein¹. ¹GLA VA, North Hills, CA; ²Greater Los Angeles VA Healthcare System, Sepulveda, CA; ³RAND Corporation, Santa Monica, CA; ⁴UCLA / VA GLA, Los Angeles, CA; ⁵VA Greater LA Healthcare System, Sepulveda CA, CA; ⁶Veterans Affairs, Sepulveda, CA. (Tracking ID #2196640)

BACKGROUND: The Veteran Health Administration (VA) has implemented a version of the Patient Centered Medical Home model called PACT—Patient Aligned Care Teams—one goal of which is to employ a team-based approach to achieve high quality, patient centered, continuous care. Under PACT, clinicians and staff are organized into small working groups called “teamlets” each of which, in the ideal implementation, consists of a Primary Care Provider (PCP), a Registered Nurse Care Manager (RN), a clinical assistant and an administrative assistant. This study was undertaken as part of the “Veterans Assessment and Improvement Laboratory (VAIL), an initiative which aimed to support and evaluate the transition to a PACT in Southern California and Western Nevada. VAIL developed a logic model to provide a framework when evaluating elements of the implementation. Effective team-based care is an important element of this support. The

objective of this study is to identify the modifiable factors that act as facilitators of team functioning during primary care practice transformation.

METHODS: Research Design: The data for the study come from a cross-sectional online survey of 818 providers and staff working in 23 VA primary care clinics, fielded in early stages of PCMH implementation (November 2011–March 2012). The overall response rate was 63 % ($n=515$). Measures: The dependent variable is a 100 point scale developed from 5 items capturing components of team functioning. The independent variables map to the VAIL logic model and include perceived support from facility leadership, attending local trainings, attending trainings with team members, job type (Primary Care Provider, Registered Nurse, clinical associate, and clerk), facility size, tenure at the VA, satisfaction with the team, and readiness for change. Associations with age, race/ethnicity, and gender were also explored but not included in the final model. Analysis: Multilevel mixed effects linear regression model with the clinic treated as the random effect.

RESULTS: Perceived support from leadership ($\beta=.139$, $z=3.34$, $p<.001$) and satisfaction with the team ($\beta=.1128$, $z=15.16$, $p<.001$) were significantly associated with team functioning. Attending local trainings, attending trainings with team members, facility size, tenure at the VA, and readiness for change were not. Associations with team functioning and age, race/ethnicity, and gender were explored but not included in the final model. Job type (Primary Care Provider (PCP), Registered Nurse (RN), Licensed Practical Nurse (LPN), and clerk) was not associated with team functioning, with the exception of one pairwise comparison. After accounting for other covariates, LPNs reported higher levels of team functioning than did PCPs ($\beta=4.65$, $z=-2.32$, $p<.05$).

CONCLUSIONS: Identifying the factors that act as facilitators to team functioning during the early implementation of a PCMH model allows us to provide the following insight to future PCMH implementation efforts: highly functioning teams have members who feel supported by their clinic and facility leaders and satisfied with the working relationships on their teams. By identifying potential facilitating factors we hope to provide guidance on where to invest resources during times of transition.

FACTORS ASSOCIATED WITH 30-DAY COPD READMISSIONS Jenny J. Lin²; Katherine Krauskopf¹; Juan Wisnivesky³. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Mount Sinai, New York, NY; ³Mount Sinai School of Medicine, New York, NY. (Tracking ID #2198988)

BACKGROUND: Preventing hospital readmissions, particularly among COPD patients is a major public health priority. Moreover, beginning in 2015, the Centers for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program, which requires CMS to reduce payments to hospitals with excess 30-day readmissions, will be expanded to include COPD. In order to reduce COPD readmissions, it is important to determine risk factors.

METHODS: We used administrative hospital discharge data from the 2011 New York State Inpatient Database (SID) of the Healthcare Cost and Utilization Project (HCUP). The study was limited to individuals ≥ 18 years of age for whom COPD was the primary admitting diagnosis. The outcome was defined as an inpatient admission ≤ 30 days after hospital discharge. Predictors of readmission included patient demographics (age, sex, race, insurance), ICD-9-derived physical and mental health comorbidities, length of stay (LOS) of COPD admission, and COPD disease severity (defined as ICD-9 evidence of pulmonary hypertension and respiratory failure). We used unadjusted and adjusted analyses with adjusting for clustering using generalized estimating equations (GEE) to assess for associations of predictors with 30-day readmission.

RESULTS: We identified 50,861 admissions where COPD was the primary diagnosis. Of these, 5839 (12 %) were followed by a 30-day readmission. Unadjusted analyses showed that patients who had a 30-day readmission were more likely to be older (mean age 71.4 vs. 70.4 years), white, have Medicare as primary insurance, and to have had a longer median LOS for the initial admission (5 vs. 4 days; $p<0.03$ for all comparisons). In adjusted analyses, readmissions were also associated with comorbid mood diagnoses ($p=0.006$), pulmonary hypertension ($p=0.03$), and respiratory failure ($p<0.002$).

CONCLUSIONS: In a large administrative dataset representing inpatient discharge records from New York State, we found that patients with COPD-related 30-day readmissions were more likely to be older, insured by Medicare, to have comorbid mood disorders, and markers of severe COPD. These findings suggest that these factors should be considered in the design of interventions to prevent readmissions in this population. Further work should assess these factors in other regions of the US to determine the breadth of their applicability as targets for interventions.

FACTORS ASSOCIATED WITH A HISTORY OF SEXUAL ASSAULT AMONG US MEN AND WOMEN

Holly N. Thomas¹; Sonya Borrero²; Rebecca C. Thurston¹.
¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh and VA Pittsburgh, Pittsburgh, PA. (Tracking ID #2199934)

BACKGROUND: A history of sexual assault is associated with poorer health and quality of life. Characterizing the factors that are associated with a history of sexual assault can help healthcare providers identify and care for individuals who have experienced it. The aim of this study was to determine the factors associated with a history of sexual assault among US adults.

METHODS: This was a cross-sectional analysis using the second wave of a US-population-based sample of individuals aged 28 to 84. Participants were initially identified by random digit dialing. The second wave of the study re-contacted the original participants from 2004 to 2006, and data were collected using telephone interviews and self-administered questionnaires. History of sexual assault, sexual orientation, and history of mood disorder were each assessed by a single question. Due to low numbers, homosexual and bisexual individuals were considered in one group. Percentages, means, and standard deviations were calculated to describe the sample. Post-stratification weights based on race, age, and education status were used to calculate percentages for the general US population. Univariable logistic regression was used to assess factors that may be related to a history of sexual assault, including demographic variables (age, race, ethnicity, education status, etc.), psychosocial variables (psychological history, marital status, drug and alcohol use, etc.), sexual orientation, and veteran status. Variables with $p < 0.10$ were entered into a multivariable model.

RESULTS: Of 2453 individuals who answered the question regarding sexual assault, 50 (4.9 %, 6.0 % weighted) men and 315 (22.1 %, 23.5 % weighted) women reported a history of sexual assault. Of those who had experienced sexual assault, 237 (70.0 %) were under 18 years old at the time of the assault, and 78.5 % of individuals were negatively affected by the assault in the long term. Among men, homosexual and bisexual individuals had 10 times higher odds of a history of sexual assault (Table 1). Veteran status was associated with 4 times higher odds of a sexual assault history. Younger age, history of a mood disorder, and religion were also associated with a history of sexual assault. Among women, veteran status was associated with 8 times higher odds of a sexual assault history (Table 2). Younger age, Hispanic ethnicity, divorced marital status, and history of mood disorder were also associated with sexual assault history.

CONCLUSIONS: Sexual assault is common, with about 5 % of men and 24 % of women reporting a history of sexual assault. Sexual minority men are more likely to report a history of sexual assault than heterosexual men; this has been demonstrated in prior studies. It should be noted that because this data is cross-sectional, causality cannot be determined. It is more likely that sexual minority men are targeted for sexual assault and *not* that a history of sexual assault leads to a homosexual or bisexual orientation. Veterans, both men and women, were more likely to report a history of sexual assault than non-veterans. Prior literature has demonstrated that a history of sexual violence is common among female veterans, but few studies have examined this issue among male veterans. Healthcare providers should be aware of these factors that are associated with a history of sexual assault; this will allow providers to perform targeted screening and identify and treat individuals who have experienced prior assault.

Table 1. Multivariable factors associated with sexual assault among men in MIDUS 2, N=1030

Variable	OR for history of sexual assault (95 % CI)	P value	Overall P value
Sexual orientation			0.002
Heterosexual	1 [ref]		
Homosexual or bisexual	10.01 (2.31, 43.30)		
Age	0.94 (0.90, 0.99)		0.009
Mood disorder (versus no)	3.03 (1.13, 8.013)		0.028
Religion			0.032
None	1.58 (0.57, 4.38)	0.38	
Protestant	1 [ref]		
Catholic	0.35 (0.07, 1.66)	0.186	
Other	3.75 (1.19, 11.78)	0.024	
Veteran (versus no)	3.54 (1.38, 9.38)		0.001

Adjusted for marital status, alcohol problem, and drug use

Table 2. Multivariable factors associated with sexual assault among women in MIDUS 2, N=1423

Variable	OR for history of sexual assault (95 % CI)	P value	Overall P value
Age	0.97 (0.96, 0.99)		0.004
Hispanic (versus no)	2.99 (1.03, 8.71)		0.044
Marital status			0.002
Married	1 [ref]		
Cohabiting	1.89 (0.83, 4.28)	0.128	
Divorced	2.46 (1.51, 4.00)	<0.001	
Widowed	0.74 (0.31, 1.74)	0.49	
Never married / not cohabiting	1.23 (0.60, 2.51)	0.57	
Mood disorder (versus no)	2.15 (1.44, 2.51)		<0.001
Veteran status (versus no)	7.80 (2.81, 21.63)		<0.001

Adjusted for sexual orientation, alcohol problem, drug use, number of sex partners, disability, homelessness

FACTORS ASSOCIATED WITH ACHIEVING CLINICALLY SIGNIFICANT WEIGHT LOSS IN A NATIONAL, NONPROFIT WEIGHT LOSS PROGRAM

Nia S. Mitchell. University of Colorado, Aurora, CO. (Tracking ID #2199211)

BACKGROUND: Overweight and obesity continue to affect almost 70 % of people in the United States, and it is important to help them lose weight because the excess weight adversely affects their health. The Institute of Medicine defines clinically significant weight loss as weight loss of ≥ 5 % of initial weight because it is associated with improvements in weight-related comorbidities, including diabetes, hypertension, and obstructive sleep apnea. Take Off Pounds Sensibly (TOPS) is a national, nonprofit weight loss group, and almost 95 % of its members are women. Observational data of 69,489 women who participated in the program for at least 1 year showed that their average weight loss was 6 % of their initial weight. However, only 50 % of those participants lost ≥ 5 % of initial weight; 32 % lost between 0 and < 5 %; and almost 18 % gained weight. The purpose of this study is to examine factors associated with achieving clinically significant weight loss at 1 year amongst TOPS female participants.

METHODS: Participants were females who joined TOPS from 2005 to 2011 and had a birthdate recorded in the TOPS national database. The initial dataset contained 52,322 women. Unadjusted analyses were performed to determine the variables used in the final multivariable log-binomial regression model. These included participant age, initial weight, number of members per chapter, and chapter age. Participant age (years) was divided into the following categories: 18 to < 45 ; 45 to < 55 ; 55 to < 60 ; 60 to < 65 ; 65 to < 70 ; and 70 and older; this allowed for similar numbers of participants in each group. Chapter size was divided into < 25 members and ≥ 25 members, and approximately half of the chapters fell into each group. Initial weight and chapter age were modeled as continuous variables.

RESULTS: Results of the model are shown in **Table 1**. Increasing age was significantly associated with achieving clinically significant weight loss. Participants in chapters with 25 members or more were 9 % more likely to achieve clinically significant weight loss than those in chapters with less than 25 members. For every 5 kg increment in initial weight, women were 1 % more likely to achieve clinically significant weight loss. For every 10 year increment of chapter age, participants were 1 % less likely to achieve clinically significant weight loss.

CONCLUSIONS: Of the categories in the model, participant age had the largest influence on achieving clinically significant weight loss. Older women may be more successful at losing weight because they have less competing demands than younger women. The number of participants in each chapter also had a significant effect on weight loss. Women in chapters with at least 25 members were more likely to achieve significant weight loss than those in chapters with less than 25 members. Chapters with more participants might be more motivating and engaging than those with less. Although initial weight and chapter age had less impact than age and chapter size, women with higher initial weights and those in newer chapters were more likely to achieve significant weight loss. Heavier women may be more successful because the suggested lifestyle changes may be a greater departure from their initial habits than their lighter counterparts; and newer chapters may represent less stagnation among members. Weight loss can be influenced by many modifiable and non-modifiable factors. It is important to know which factors influence weight loss to maximize the success of those trying to lose weight.

Adjusted Relative Risk for Achieving Clinically Significant Weight Loss at 1 Year by Category

Category	Sub-category	Adjusted Relative-Risk (95 % confidence interval)	P value
Age (years)	18 to <45 (ref.)	—	—
	45 to <55	1.11 (1.07, 1.15)	<.0001
	55 to <60	1.18 (1.13, 1.22)	<.0001
	60 to <65	1.20 (1.16, 1.24)	<.0001
	65 to <70	1.23 (1.19, 1.28)	<.0001
	≥70	1.31 (1.26, 1.35)	<.0001
Chapter size	<25 members (ref.)	—	—
	≥25 members	1.09 (1.07, 1.11)	<.0001
Starting weight (kg)	Weight (per 5 kg)	1.01 (1.00, 1.01)*	<.0001
Chapter age (years)	Chapters age (per 10 years)	0.99 (0.98, 1.00)*	.001

*The 95 % CI appears to contain 1.00 due to rounding.

FACTORS ASSOCIATED WITH BORDERLINE VERSUS DEFINITE PERIPHERAL ARTERY DISEASE AMONG AFRICAN AMERICANS

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Research reported in this publication was supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number R01HL098909. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

BACKGROUND: Peripheral artery disease (PAD), defined as atherosclerosis of the abdominal aorta and arteries of the lower extremities, is a common disease affecting 8 to 12 million Americans. PAD disproportionately affects African Americans as compared to non-Hispanic whites. Prior studies have focused on defining risk factors for PAD but less is known about factors associated with PAD versus borderline disease among African Americans. We sought to determine those factors associated with definite versus borderline disease among African Americans.

METHODS: Currently, we are conducting a 5-year study, 12-month trial, funded by the NIH in which we seek to determine the efficacy of a behavioral intervention to improve walking distance among African American adults with PAD. Participants complete three visits which include baseline, 6, and 12 months. We analyzed baseline data from this clinical trial. Trial eligibility includes self-identifying as African American and screening positive for PAD based on an objective assessment, the ankle-brachial index (ABI; ratio of systolic blood pressure in the ankle to that in the arm). Participants must have PAD (ABI < 0.9) or borderline disease (ABI 0.91–0.99). Participants are excluded if they have undergone lower extremity amputation, leg revascularization (open or endovascular) within the preceding 3 months, contraindications to walking for exercise, and a treadmill test positive for coronary ischemia. For the latter, participants can be eligible following treatment for coronary ischemia. Variables collected are; laboratory data (lipid profile and glycosylated hemoglobin) and vital signs including BMI. Participants also complete interviewer-administered, validated surveys to ascertain medical history (Lifestyle and Clinical Survey), dietary habits (Food Frequency Questionnaire), quality of life (Vascular Quality of Life Questionnaire), and leg symptom subtypes (San Diego Claudication Questionnaire). For the bivariate analysis, we used chi-square and t-tests for categorical and continuous variables, respectively. For the multivariate model, we used generalized linear modeling with the dependent variable of ABI < 0.9. Independent variables considered for each model included laboratory results, leg symptom subtypes of intermittent claudication or atypical leg symptoms versus asymptomatic disease, medical history (categorical variables), and dietary habits.

RESULTS: Among 107 African Americans enrolled, 75 % are women. The mean age of the cohort is 64 years (SD 12). Within the cohort, 92 (86 %) have hypertension, 38 (36 %) have diabetes mellitus, 26 (24 %) are current smokers, 59 (55 %) have hyperlipidemia, 58 (54 %) are past smokers, and 41 (38 %) have osteoarthritis. Factors significantly associated with definite versus borderline PAD were consumption of bad fats 5 or more times per week adjusted OR 3.97 (95 % CI 1.16, 13.65) and systolic blood pressure adjusted OR 1.06 (95 % CI 1.01, 1.10).

CONCLUSIONS: Factors associated with definite versus borderline PAD among African Americans included diets high in bad fats and systolic blood pressure. This is one of the first studies to identify an association between dietary habits and PAD. Future work should address the role of a dietary intervention and the impact of systolic blood pressure control to reduce the risk of progressing from borderline to definite PAD among African Americans.

FACTORS ASSOCIATED WITH DISTINCT RESIDENTIAL PATTERNS IN OLDER HOMELESS ADULTS Christopher T. Lee¹; David Guzman²; Claudia Ponath²; Lina Tieu¹; Elise Riley¹; Margot Kushel^{1, 2}. ¹University of California, San Francisco, San Francisco, CA; ²San Francisco General Hospital, San Francisco, CA. (Tracking ID #2191845)

BACKGROUND: Subpopulations of homeless individuals reside in different environments which haven't been described in the existing literature. These individuals have different risk profiles and residential venues themselves may mediate exposure to trauma, access to services, and opportunities for rehousing. We used a cluster analysis to create a classification of residential venues among a sample of older homeless adults and identified factors associated with these venues. Defining residential patterns and determining factors correlated with them may allow for more targeted service delivery and further elucidate the role of the lived environment in mediating the morbidity and chronicity of homelessness.

METHODS: We conducted structured interviews with 350 individuals aged 50 and older experiencing homelessness, as defined by the HEARTH Act (2009). We recruited participants using population-based sampling from encampments, recycling centers, homeless shelters, and low-cost meal programs in Oakland, CA as a baseline study of the Health Outcomes of People Experiencing Homeless in Older Middle Age (HOPE-HOME) cohort. Participants used a residential time-line inventory to characterize where they lived in the 180 days preceding the interview. With these data, we used cluster analysis to generate four patterns of residential venues. We assessed demographics and lifetime histories of substance use and mental health problems prior to losing stable housing and physical and sexual abuse during the last year of stable housing. We measured social supports using an index comprised of whether the individual had a confidant and someone to lend them money and created an institutional support index using principal component analysis of variables for having case managers, primary care clinics, and receiving government assistance in the last year of stable housing. We used nonparametric ANOVA to identify differences in risk factors between housing clusters and multinomial logistic regression to generate adjusted relative risk ratios (RRR) for predictors of each group, using the largest (unsheltered cluster) as the baseline.

RESULTS: The sample was 77.1 % men with a mean age of 58.1 years. Cluster analysis revealed four housing groups: "unsheltered" individuals ($n=162$) spent an average of 85.6 % of days living on streets or encampments, "cohabiters" ($n=57$) spent 71.2 % of days living with friends or family, "renters" ($n=43$) spent 80.2 % of days in their own rented rooms or apartments, and "shelter users" ($n=88$) spent time in shelters (39.4 % of days) and transitional housing or hotels (22.7 % of days). Women were overrepresented in the cohabiters (45.6 %) and renters (32.6 %) compared to the unsheltered (14.2 %) and shelter users (19.3 %) ($P<0.001$). The number of days homeless this episode were significantly higher in the unsheltered (1739.9) and shelter users (1167.1) than in the cohabiters (498.3) and renters (294.7) ($P<0.001$). Pre-homeless institutional supports were significantly higher in the renters compared to the unsheltered cluster ($P=0.006$). There were no significant differences in age, race, education, veteran status or history of mental health problems between groups. After adjustment, compared to the unsheltered cluster, predictors for membership in the cohabiters cluster were being a woman (RRR 4.4, $P=0.002$), older age of first homelessness (RRR 1.04 per year, $P=0.04$), history of abuse (RRR 2.9, $P=0.03$) and greater social support (RRR 2.3, $P=0.004$). Predictors for membership in the renters cluster were being a woman (RRR 3.7, $P=0.02$) and shorter duration of homelessness (RRR 0.8, $P=0.045$). The shelter user cluster was associated with greater social support (RRR 1.6, $P=0.03$) and negatively associated with prior regular cocaine use (RRR 0.4, $P=0.004$).

CONCLUSIONS: We identified four distinct residential patterns among older homeless persons, each associated with unique social factors. Those with more recent onset of homelessness, particularly women, are significantly less likely to reside in shelters or streets. Identifying renters and cohabiters who are hidden from traditional enumeration methods may allow for targeted interventions for those imminently at risk of losing housing. The unsheltered and shelter users represent two distinct populations; lower levels of drug use and greater social supports may have enabled shelter users to avoid living on streets. Social support was significantly protective against street homelessness; our findings add to the existing literature on the broadly protective role of social support in homeless populations by elucidating effects specifically among older homeless individuals. We find that using a broader sampling frame for homelessness allows for the identification of distinct subpopulations that are underrepresented in the literature.

FACTORS ASSOCIATED WITH FOLLOW-UP VISIT PATTERNS AT A UNIVERSITY CARDIOLOGY PRACTICE Caterina Y. Liu; Michael Wang; Ralph Gonzales. UCSF, San Francisco, CA. (Tracking ID #2194757)

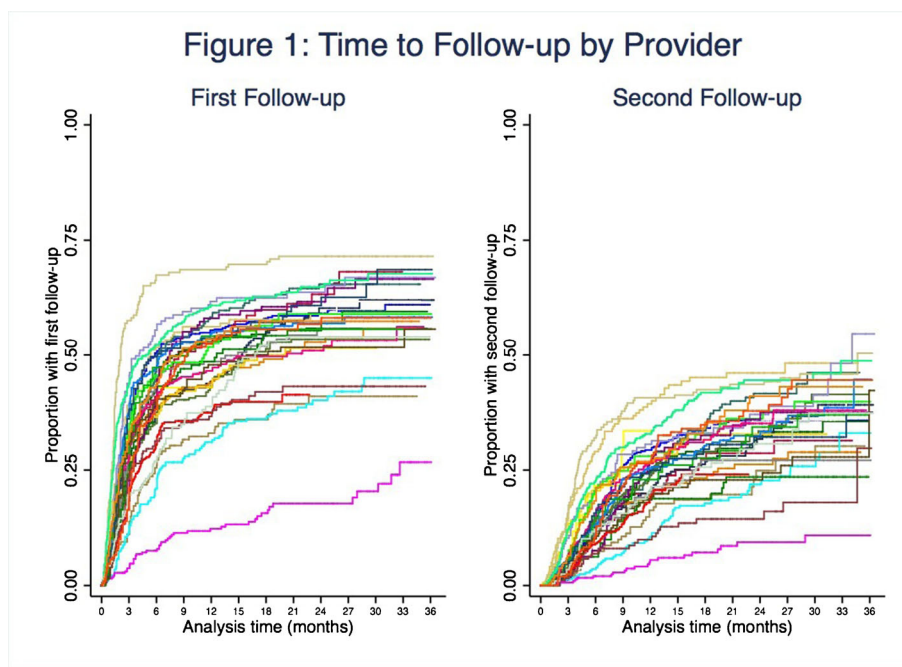
BACKGROUND: Follow-up care is an essential component of outpatient medicine, but few guidelines address appropriate frequency. In specialty care, follow-up visits comprise over 75 % of total visits in US ambulatory care practices. Excess follow-up visits consume available appointment supply and contribute to long wait times and delays in care. We studied follow-up visit patterns for new patients to a university-based cardiology practice, and how patterns vary by patient, provider and system factors.

METHODS: This is a retrospective cohort study of patients who completed a new patient visit at an urban university-based cardiology practice during fiscal years 2012–2014. Data was extracted from the electronic medical record database. The primary outcomes were time and frequency of follow-up visits to a physician or nurse practitioner in the cardiology practice during the observation period; visits for procedures and tests were excluded. Predictor variables included patient factors (age, gender, race, diagnosis); provider factors (gender, type); and system factors (insurance type, primary care within the university health system). Providers with fewer than 100 new patients were excluded to improve reliability of point estimates and increase generalizability. Both first follow-up and second-follow-up visits were examined as outcomes with two or more follow-up visits representing a population of patients for whom ongoing care in the specialty clinic is more likely. In bivariate analyses, the log-rank test was performed to test for statistical significance of differences in time to first and second follow-up across patient, provider, and system variables. Cox proportional hazards regression analysis was performed to examine predictors of time to first and second follow-up. All analyses were conducted using Stata 13 (StataCorp, TX).

RESULTS: During the 3-year study period, this cardiology practice provided 89,492 patient care visits, of which 9032 were new patient visits. The mean age was 56 years,

52 % were male, 54 % were Caucasian, 40 % had private insurance, and 25 % had a primary care provider within the same university system. Cardiac dysrhythmia was the most common diagnosis (25.5 %). Overall, half of patients had at least one follow-up visit and a quarter had at least two follow-up visits within 1 year of their initial visit. The 15 % of patients with 3 or more follow-up visits accounted for 58 % of the follow-up visit volume generated by new patients. In bivariate analyses, the proportion with at least one follow-up varied statistically significantly by provider (**Figure 1**), practice year, gender, race, insurance, primary care location, and diagnosis. Results were similar for time to second follow-up, although practice year was no longer statistically significant. In Cox regression analyses, independent predictors of time to first follow-up included patient age (HR 1.03 (1.00–1.06) for 10 year increase), gender (HR 0.91 (0.85, 0.98) for females), race (HR 1.18 (1.07, 1.30) for Asian relative to Caucasian), insurance (HR 1.22 (1.07, 1.39) for Medi-Cal compared to private insurance), practice year (HR 0.68 for FY13 compared to FY12), primary care within the same system (HR 1.11 (1.02, 1.19)) and diagnosis (HR 1.42 (1.18, 1.70) for congestive heart failure compared to coronary artery disease). Estimates were similar for time to second follow-up. In both models, the individual physician variable remained significantly associated with follow-up after adjustment.

CONCLUSIONS: There is large variation in follow-up practices by patient, provider, and system factors within this university-based cardiology practice. Individual provider variation in follow-up visit patterns persisted after adjusting for patient and system factors. A small proportion of new patients generated most of the follow-up volume, while a majority of patients never had any follow-up. These results suggest an opportunity to standardize how follow-up visit decisions are made in cardiology clinic, with the potential goal of increasing specialty care access.



Time to follow-up by provider: each line represents an individual provider's practice behavior.

FACTORS ASSOCIATED WITH RESIDENT CONTINUITY IN AMBULATORY TRAINING PRACTICES Megan Ditty; Julia West; Brett Robbins; Lynn C. Garfunkel; Karen Nead; Michael Mendoza; Robert J. Fortuna. University of Rochester, Rochester, NY. (Tracking ID #2194668)

BACKGROUND: Continuity and longitudinal care of patients are cornerstones of primary care and have been associated with improved outcomes in care. Providing a longitudinal primary care experience between residents and patients is a key goal of residency training. Our objective was to identify factors that are associated with increased

continuity in residency teaching practices and to examine how continuity is associated with quality measures.

METHODS: We analyzed 120,400 patient visits to four resident continuity programs in Upstate New York between 7/1/2013 and 6/30/14. We defined continuity from both the resident and patient perspective. Resident continuity was defined as the percent of patients seen by a resident who are their primary patient. Patient continuity was defined as the percent of all patient visits seen by either their primary resident or team attending. We surveyed program directors, clinic directors, office managers, and chief residents to determine what factors each site used to promote continuity. Data were analyzed using chi square tests for proportions and Cochran-Armitage tests for trends. Logistic regression models were used to examine the independent influence of factors on continuity.

RESULTS: Resident continuity ranged from 33.1 to 83.7 % between sites. Patient continuity ranged from 20.6 to 71.5 %. Factors associated with improved resident continuity included absence of physician extenders (nurse practitioners or physician assistants) (71.5 % vs 51.7 %; $P < 0.001$), advancing post-graduate year (PGY) of resident

(54.9 to 69.9 %; $P < 0.001$), offering morning clinic sessions (59.5 % vs 33.1 %; $P < 0.001$), increased mean clinical faculty FTE (33.1 to 71.5 %; $P < 0.001$), scheduling protocol for acute visits (41.1 % vs 77.5 %; $P < 0.001$), and having a policy for patient dismissal for missed appointments (51.7 % vs 71.5 %; $P < 0.001$). Similarly, factors associated with improved patient continuity include included absence of physician extenders, advancing PGY, offering morning clinic sessions, providing more than one clinical session per week with the primary resident, increased mean clinical faculty FTE, scheduling protocols, and having a patient dismissal policy ($P < 0.001$ for all). Increased patient continuity was associated with improved rates of diabetic control (54.6 to 62.8 %; $P < 0.001$), hypertension control (57.5 to 82.8 %; $P < 0.001$), screening colonoscopy (31.9 to 69.2 %; $P < 0.001$), and screening mammography (38.2 to 74.8 %; $P < 0.001$).

CONCLUSIONS: Variations in resident and patient continuity are associated with a number of modifiable clinic factors. Increased clinical faculty time, scheduling protocols, and the absence of physician extenders were most strongly associated with increasing continuity. Improving continuity may help improve important quality measures, including diabetic control, hypertension control, and cancer screening rates.

FACTORS ASSOCIATED WITH THE DIAGNOSIS OF OBESITY IN ADOLESCENTS AND YOUNG ADULTS Erica O. Miller; Bryan Stanistreet; Robert J. Fortuna. University of Rochester, Rochester, NY. (Tracking ID #2194781)

BACKGROUND: In the United States, 17 % of children and 36 % of adults are obese based on BMI standards, yet few patients receive a clinical diagnosis of obesity or are counseled about lifestyle modification. We examined the rates of diagnosis of obesity and evaluated socioeconomic and demographic factors associated with the accurate diagnosis of obesity in obese individuals.

METHODS: We assessed the rates of diagnosis of obesity using the National Ambulatory and National Hospital Ambulatory Medical Care Surveys (NAMCS and NHAMCS). Obesity was defined by Body Mass Index (BMI) according to nationally accepted standards. We determined if a patient with obesity based on BMI had been clinically diagnosed with obesity via either of the following (1) a diagnosis listed in the patient's chart; or (2) the provider's answer to the direct question "despite the diagnoses listed, does this patient have obesity?" In obese individuals, we examined the association between the accurate diagnosis of obesity and socioeconomic status, age, gender, race, ethnicity, insurance status, and geographic region. We determined level of education based on the percent of patients with a college education within a specific geocode. We used bivariate comparisons for socioeconomic status with multivariate regression models to adjust for age, gender, race, and ethnicity.

RESULTS: We examined 180,211,878 weighted office visits from obese children, adolescents, and young adults aged 5–34 years between 2006 and 2010. Obese young adults (aged 22–34 years) were more likely to be accurately diagnosed with obesity compared to obese adolescents (aged 13–21 years) or obese children (45.4 % vs 39.7 % vs. 23.4 %; $P < 0.001$). Overall, obese individuals residing in more highly educated areas were more likely to be diagnosed with obesity than those living in less highly educated areas (43.1 % vs. 36.9 %; Adjusted Odds Ratio (AOR) 1.5; 95 % CI 1.1–2.0). Among obese young adults, individuals were more likely to be diagnosed if they resided in more highly educated areas (AOR 1.6; 95 % CI 1.1–2.3) or were female (AOR 2.2; 95 % CI 1.5–3.2). Similarly, adolescents were more likely to be diagnosed if they resided in more highly educated areas (AOR 1.6; 95 % CI 1.0–2.5), were female (AOR 1.9; 95 % CI 1.5–3.4), or were non-white (AOR 1.9; 95 % CI 1.0–3.4). Patients in the Northeast were more likely to be diagnosed with obesity than those in the Midwest, South, and West.

CONCLUSIONS: Risk for underdiagnosis of obesity is highest in less educated areas and males. These trends reflect the complex interactions of many factors affecting the diagnosis of obesity. Identification of at-risk groups helps clinicians understand biases to increase accurate diagnosis of obesity, which can improve access to appropriate counseling, screening, and management.

FACTORS ASSOCIATED WITH WALKING ABILITY AMONG AFRICAN AMERICANS WITH PERIPHERAL ARTERY DISEASE Tracie C. Collins¹; Rosalee Zackula²; Nikki Nollen⁴; Nicole Rogers³; Jasjit Ahluwalia². ¹KU School of Medicine - Wichita, Wichita, MN; ²University of Kansas School of Medicine-Wichita, Wichita, KS; ³Wichita State University, Wichita, KS; ⁴University of Kansas School of Medicine, Kansas City, KS; ⁵University of Minnesota, Minneapolis, KS. (Tracking ID #2199126)

Research reported in this publication was supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number R01HL098909. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

BACKGROUND: African Americans are two times more likely than non-Hispanic whites to have peripheral artery disease (PAD)—atherosclerosis of the abdominal aorta and arteries of the lower extremities. Walking distance is a commonly measured outcome among patients with PAD but less is known about the factors associated with this outcome among African Americans with PAD. We sought to determine the risk factors associated with walking distance among a cohort of African Americans with PAD.

METHODS: We analyzed baseline data from an ongoing 5-year NIH funded clinical trial in which we seek to determine the efficacy of a behavioral intervention to improve walking distance among African Americans with PAD. Trial eligibility includes self-identifying as African American and screening positive for PAD as defined by an ankle-brachial index (ABI) ≤ 0.99 . Participants are excluded if they have undergone lower extremity amputation, leg revascularization (open or endovascular) within the preceding 3 months, contraindications to walking for exercise, and a positive screen for coronary ischemia as determined by a treadmill test. Participants complete a baseline visit and two follow-up visits at 6-, and 12 months. Variables collected include walking distance (6-min walking test), functional status (Short Physical Performance Battery Testing [SPPB]), laboratory data (lipid profile and glycosylated hemoglobin) and vital signs including BMI. Participants also complete interviewer-administered, validated surveys to ascertain medical history (Lifestyle and Clinical Survey), quality of life (Vascular Quality of Life Questionnaire), and leg symptom subtypes (San Diego Claudication Questionnaire). For this sub-analysis, we used generalized linear modeling with the dependent variable of walking distance (continuous variable). Independent variables considered for each model included ABI < 0.9 versus higher), functional status (SPPB score 1 to 10), leg symptom subtypes (intermittent claudication or atypical leg symptoms versus asymptomatic disease), glycosylated hemoglobin (7 or higher), and medical history.

RESULTS: Among the 107 African Americans enrolled, 75 % are women and the mean age of the cohort is 64 (SD 12). Mean baseline walking distance among the cohort was 1152 ft (SD=240). Within the cohort, 92 (86 %) have hypertension, 38 (36 %) have diabetes mellitus, 26 (24 %) are current smokers, 59 (55 %) have hyperlipidemia, 58 (54 %) are former smokers, and 41 (38 %) have osteoarthritis. Factors associated with greater walking distance included quality of life score [β coefficient 64.358 ($P=.003$)], glycosylated hemoglobin [β coefficient 163.402 ($P=.002$)], diastolic blood pressure [β coefficient 5.614 ($P=.019$)], and SPPB scores [β coefficient 63.722 ($P<.001$)]. In contrast, systolic blood pressure was associated with a lower walking distance [β coefficient -3.285 ($P=.027$)]. No statistically significant associations were found between ABI, gender, BMI, leg symptom subtypes, LDL, or triglycerides and walking distance.

CONCLUSIONS: Factors associated with walking ability among African Americans with PAD included quality of life, systolic blood pressure, diastolic blood pressure, and SPPB. Future research should identify the role of controlling systolic blood pressure and improving SPPB scores to increase walking in this population. Further, more studies are needed to assess the association of diastolic blood pressure with PAD and to identify the causal association between quality of life and walking distance among African Americans with PAD.

FACTORS IMPACTING THE LENGTH OF ROUNDS ON AN INPATIENT MEDICINE TEACHING SERVICE Justin M. Glasgow; Himani Divatia; Joseph M. Deutsch. Christiana Care Health System, Newark, DE. (Tracking ID #2195389)

BACKGROUND: Medical residency programs use inpatient rounds as a time to review clinical data, discuss plans of care, communicate with patients, family, and other care providers, and to teach the science and art of medicine. With these many varied goals, our program struggles to keep inpatient rounds to a maximum of 180 min (lasting 9 am to noon) so as to limit impact on other clinical and educational activities. In response to this challenge, a group of hospitalists and residents at our institution restructured our inpatient teams and began conducting daily surveys with the goal of identifying how various factors impact the length of teaching rounds.

METHODS: After restructuring the residency program has 4 teaching teams in a large suburban hospital, divided equally among two hospitalist groups, one a hospital owned group and the other a private group. The teams have one of two structures, either a single resident with two interns or a single resident with one intern. Additionally, there is a two resident, two intern team at a smaller urban hospital within the program. Using a mobile

survey platform a six question survey was “texted” to one resident per team prior to weekday afternoon sign-out rounds. The survey questions were: a) Team name, b) Rounding start time, c) Rounding end time, d) Number of patients, e) Number of patients new to the attending, and f) Number of team members participating in rounds. Results from these surveys were used to create generalized linear models that predicted length of rounds based on number of patients seen, number of team members, and number of new patients as fixed effects with separate models for attending, teaching team, and hospitalist company as random effects.

RESULTS: The surveys have a 53 % response rate (285/535). During this period, rounds averaged 185 min, ranging 60–390 min, and 36 % (103/285) of responses recorded a length of rounds that exceeded 180 min. Teams saw an average of 12 patients, ranging 3–20, with a median of 3 new patients each day. The final factors impacting the length of inpatient rounds were 1) Number of patients seen, 2) Number of new patients, and 3) Individual attending. After accounting for those factors, the number of members rounding with the team, the team structure, nor the hospitalist program appeared to significantly impact the length of rounds. The final model was Length of Rounds (in minutes) = $77 + 6.5\alpha + 2.3\beta + \gamma$, where α = Number of patients seen, β = Number of new patients, and γ is the random effect for each of the 36 attendings in the sample. Values for attending impact (γ) ranged from -73 min–102 min. While interpretation of the data is limited given the minimal information collected during the survey, the model suggests that teams spend on average 6.5 min presenting a patient, an additional 2.3 min presenting a new patient, and 77 min with other tasks such as multi-disciplinary rounds, walking between rooms, and educational activities. The time spent on these additional activities, however varied significantly across individual attendings as exhibited by the wide range of γ values.

CONCLUSIONS: The survey demonstrated that approximately a third of medicine teaching rounds exceeded our program goal of 180 min. While the number of patients seen played an expected role in the length of rounds, our data showed that variation across attendings had a significant impact. The results of the analysis are currently being used to drive the next round of systems redesign in two key manners. First, attendings are being provided with their individual results while a faculty committee is creating a teaching attending development program to address individual variance. Second, we are developing a time observation study to better understand how time is spent on activities during rounds and how much of that time would be considered non-value added.

FAMILIAL CLUSTERING OF DIABETES INFLUENCES TYPE 2 DIABETES RISK MORE STRONGLY THAN SOCIAL CLUSTERING OF OBESITY: A SOCIAL NETWORK ANALYSIS IN THE FRAMINGHAM OFFSPRING STUDY Sridharan Raghavan¹; Mark C. Pachucki³; Yuchiao Chang²; Josée Dupuis¹; James B. Meigs³. ¹Boston University SPH, Boston, MA; ²Harvard Medical School, Boston, MA; ³Massachusetts General Hospital, Boston, MA. (Tracking ID #2199071)

BACKGROUND: Social network analysis allows examination of shared characteristics, including health behaviors and diseases, between individuals who are socially connected to one another. Obesity and family history of diabetes are the two strongest risk factors for type 2 diabetes (T2D). Prior work in the Framingham Heart Study has shown that an individual's risk of obesity is influenced by his/her social contacts—both non-familial contacts and family members; however, whether shared obesity risk across social ties translates to shared diabetes risk remains unexplored. We examined T2D clustering in a social network to estimate the influence of familial and non-familial social ties on diabetes risk. We hypothesized that type 2 diabetes risk is associated with social ties to other people with diabetes and with body mass index (BMI) of social contacts.

METHODS: Administrative data identified interpersonal ties between Framingham Offspring Study participants at each of 8 exam visits between 1971 and 2008 ($N=4872$ participants). Diabetes status of each person (ego) and each social contact (alter) was defined as fasting glucose >125 mg/dl or taking diabetes medications. We used generalized estimating equations clustered by ego to estimate associations between prevalent ego diabetes and alter diabetes and BMI across 8 exams, adjusting for ego's sex, age, BMI, self-reported T2D family history, count of 19 common diabetes genetic variants, social network size, and exam visit. Analyses were repeated in networks stratified by familial versus non-familial ties.

RESULTS: Ego T2D was associated with alter T2D (OR 1.38, $p=0.005$) but not alter BMI (OR 1.01, $p=0.30$). When stratified by ego-alter relationship, ego T2D was associated with familial alter T2D (OR 1.57, $p=0.003$) but the effect was weaker for non-familial alter T2D (OR 1.30, $p=0.07$). Adjusting for genetic risk attenuated the familial ego-alter T2D association (OR 1.43, $p=0.02$) but marginally strengthened the non-familial ego-alter T2D association (OR 1.33, $p=0.04$). Though ego BMI was strongly associated with alter BMI, ego T2D was not associated with alter BMI in either familial or non-familial contacts.

CONCLUSIONS: We found that T2D risk was shared across social ties, with a greater effect across familial than non-familial ties. Though obesity is known to be shared among social contacts, shared T2D risk was independent of shared obesity. That familial T2D clustering is not explained fully by family T2D history and T2D genetic risk suggests additional shared risk factors among related individuals. Further analyses that account for ego education and interactions of genetic risk with relationship type are needed to fully characterize T2D risk in social networks.

FAMILY CAREGIVERS AND THEIR ROLES IN THE TRANSITION FROM HOSPITAL TO HOME FOR LIMITED ENGLISH PROFICIENT PATIENTS

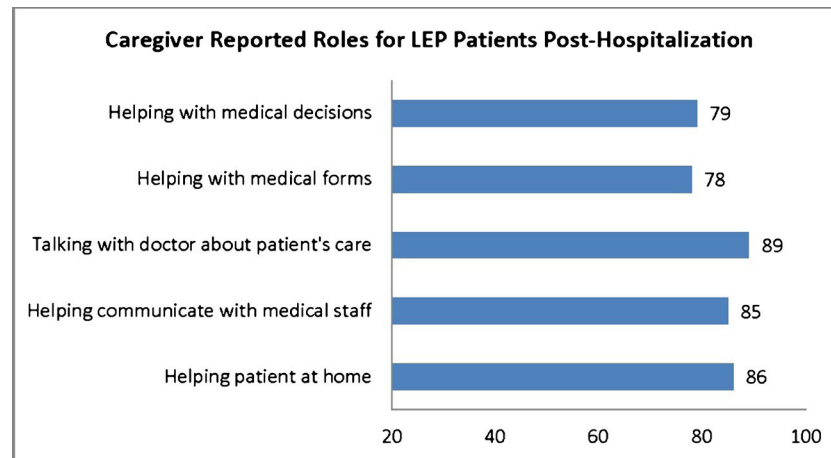
Leah S. Karliner; Eliseo J. Perez-Stable; Sunita Mutha; Anna M. Napoles. UCSF, San Francisco, CA. (Tracking ID #2199304)

BACKGROUND: Older patients often rely on family caregivers for help with their medical needs and communication with their medical care team, particularly when hospitalized. Involvement of a family caregiver during hospitalization is especially common among patients with limited English proficiency (LEP). Yet, little is known about family caregivers or their roles at the time of hospitalization and during the immediate post-discharge transition period.

METHODS: As part of a larger study of discharge communication with hospitalized LEP patients, we interviewed Chinese and Spanish speaking patients hospitalized on the cardiology, general surgery, and orthopedic floors of an urban academic medical center. Patients were asked about their family caregivers and to identify the caregiver who was present to receive medical information at the time of discharge. We then interviewed that caregiver by telephone about their relationship with the patient, general caregiver roles, roles since hospitalization, and their own health status and demographics.

RESULTS: We interviewed 214 hospitalized LEP patients; 138 (64 %) were Chinese-speakers and the remainder Spanish-speakers; 120 (56 %) were women; mean age was 69. Two-thirds (68 %) reported having someone to help them make important medical decisions. The vast majority reported that they had someone to help talk with the doctor about their medical care (85 %) and communicate with hospital staff (81 %). For approximately two-thirds, the caregiver was an adult child/grandchild. Most (89 %) said someone would be helping them at home after discharge, this was most often an adult child/grandchild (42 %) or a spouse/partner (25 %). We interviewed caregivers for 160 of the patients (12 patients reported having no caregiver present at the time of discharge, 11 died before follow-up and no caregiver was interviewed, we were unable to contact 21 caregivers, and 10 caregivers refused participation). Among the 160 caregivers, 66 % were women and mean age was 47. Most (81 %) were born outside the U.S., only 41 % reported English as their preferred language for healthcare, 24 % had not completed high school, and 30 % had inadequate health literacy based on a 3-item scale. A third reported their own health to be less than ‘good’, and a quarter reported financial hardships in the past year. The majority (69 %) were the patient's adult child/grandchild, while 21 % were spouses/partners, 9 % other relatives and 1 % friends. While 41 % lived in the same home as the patient, a third lived in another nearby city. Three-quarters reported seeing the patient every day since discharge. Although 38 % reported feeling no stress in the past week about caring for the patient, 18 % reported feeling stress all or most of the time, 22 % some and 22 % a little of the time.

CONCLUSIONS: Family caregivers perform multiple vital roles for LEP patients in the transition from hospital to home, including assisting with communication and decision-making. However, many of these caregivers are themselves non-English speakers with inadequate health literacy, and a substantial proportion also report financial and caregiver stress. Future investigations should identify the unique communication and support needs of caregivers of LEP patients and examine the relationship between providing support and health outcomes for both LEP patients and their caregivers.



FEASIBILITY AND EVALUATION OF ON-SITE DIABETES SCREENING, MONITORING, SELF-MANAGEMENT SUPPORT, AND FOOD FROM LOCAL FOOD PANTRIES Hilary Seligman^{1,3}; Courtney Lyles^{1,3}; Kim Prendergast²; Michelle Berger-Marshall²; Elaine Waxman². ¹University of California, San Francisco, San Francisco, CA; ²Feeding America, Chicago, IL; ³Center for Vulnerable Populations, San Francisco, CA. (Tracking ID #2196377)

BACKGROUND: Health clinics have a challenging time reaching many of the most marginalized patients with diabetes, particularly for the frequent visits necessary to provide self-management support. Food pantries are easily accessible, engage the same clients repeatedly over time, reach a highly vulnerable segment of the population, and offer food. We explored the feasibility and effectiveness of providing diabetes self-management support and monitoring in the food pantry setting.

METHODS: We screened a convenience sample of Spanish- and English-speaking food pantry clients affiliated with three food bank networks in California, Texas, and Ohio. Clients with a new or confirmed diagnosis of diabetes (using point-of-care HbA1c testing at the food pantry) were invited to participate in an on-site diabetes intervention that varied across sites but included, at a minimum, bi-monthly boxes of diabetes-appropriate foods, self-management education, on-site monitoring of HbA1c, and referral to a primary care home (if none existed). We conducted surveys at baseline and 4-month follow up and examined pre-post changes in HbA1c and diabetes self-management support using paired t-tests and McNemar's tests.

RESULTS: We identified 768 participants with diabetes, 89 % of whom completed pre-post evaluation surveys (mean age 57 years; 74 % female; 53 % Latino; 62 % with high school degree or less; 39 % low food secure and 44 % very low food secure). Mean HbA1c was 8.1 % at baseline and fell to 7.9 % at follow up ($p < 0.01$, with reductions at the three sites of 0.14, 0.19, and 0.39 %). Reports of severe hypoglycemic events fell from 15 to 11 % ($p = 0.05$). We also observed statistically significant improvements in fruit and vegetable intake, medication adherence, self-efficacy, diabetes distress, depressive symptoms, and medication affordability. Participant satisfaction was high.

CONCLUSIONS: It is feasible to use point-of-care HbA1c testing in the food pantry setting to screen clients for diabetes/pre-diabetes and monitor glycemic control of clients with known diabetes. This intervention appeared to significantly and positively impact HbA1c and diabetes self-management. Although food pantries are a non-traditional setting for addressing diabetes, this pre-post data gives evidence that, at a minimum, such translation of self-management support into community-based settings without robust health expertise may be a promising model for future health promotion.

Pre-Post Changes in Outcomes

	Pre-Intervention	Post-Intervention	p-value
HbA1c, mean	8.1 %	7.9 %	<0.01
HbA1c >9 %, %	28 %	25 %	0.09
Severe hypoglycemic events, %	15 %	11 %	0.05
Fruit and vegetable intake, mean servings/day	2.8	3.1	<0.01
Medication non-adherence, mean (0-4)	1.2	1.1	<0.01
Self-efficacy, mean (1-10)	6.8	7.3	<0.01
Diabetes distress, mean (1-6)	3.1	2.7	<0.01
Food vs. medicine/ supplies trade-offs, %	47 %	36 %	<0.01

FEEDBACK AS A TOOL FOR PROMOTING HIGH QUALITY DOCUMENTATION AMONG INTERNAL MEDICINE RESIDENTS Amalia Wegner¹; Lorna Campbell¹; Yushu Shi³; Kathryn Fletcher². ¹MCW, Milwaukee, WI; ²Milwaukee VAMC/Medical College of Wisconsin, Milwaukee, WI; ³PCOR, Milwaukee, WI. (Tracking ID #2194883)

BACKGROUND: Inpatient progress notes are a key component of care for hospitalized patients. However, notes written by residents are far removed from this ideal, with most notes being too long while still missing key pieces of information (e.g. accurate plans). This issue spans residency programs throughout the country; as a result, the Internal Medicine Resident Review Committee (under the ACGME) instituted Milestone 22 to focus on competence of written documentation. Our study aimed to improve the overall quality of inpatient progress notes using an audit and feedback intervention.

METHODS: Our study design is a prospective, pre-post intervention at a large teaching hospital. Between September 2014-December 2014, we assessed the quality of inpatient notes written by residents on the General Internal Medicine ward teams. We assessed quality by using the PDQI-9, a validated tool that allows a reviewer to score 9 attributes on a 5-point Likert-type scale: up-to-date, accurate, thorough, useful, organized, comprehensible, succinct, synthesized, and internally consistent. We scored one note per resident during the second week of the month (pre-intervention), followed by feedback to the resident which was specific to that scored note. We then scored another note in the third week of the same month (post-intervention) to assess the impact of the feedback. We collected additional data for each reviewed note: year of training of the writer, training program of the writer (e.g. categorical medicine versus preliminary), if this was the writer's first inpatient medicine ward month, team census, patient hospital day, number of problems on the problem list, patient age and sex. We used paired t-tests for univariate analysis and a mixed model regression for the multivariable analysis.

RESULTS: We reviewed 94 notes, with 61 % of notes written by PGY 1's and 61 % notes were from the categorical medicine program. The average team census was 11 patients. Mean patient age was 61 years old. Patient had an average of 7.3 problems on the problem list. All attributes improved from week 2 (pre-intervention) to week 3 (post-intervention) but the following attributes significantly improved: total score, synthesized, succinct, and thorough (table). In multivariable analysis, PGY 3's had significantly higher total PDQI-9 scores than PGY 1's. There were no other significant predictors of PDQI-9 score.

CONCLUSIONS: Many medical educators believe that progress notes provide an opportunity for residents to actively synthesize patient issues and demonstrate knowledge. Of course, progress notes are also an extremely important communication tool. Therefore, high quality notes are of importance for education and patient care. We have demonstrated that a simple audit and feedback intervention can improve the overall quality of inpatient progress notes, with the most significant improvement demonstrated in the attributes of synthesized, succinct, and thorough. Limitations of this study include that sustainability of these results has not yet been assessed and that the intervention requires faculty time and effort. Other programs may benefit from introducing a similar intervention.

Significantly Improved Progress Notes Attributes

Attributes	Pre-Intervention (Mean, SD)	Post-Intervention (Mean, SD)	Change in Mean (Post-Pre)	P-value
Total score (9–45)	34.98 (5.42)	36.95 (5.28)	1.979	0.0022
Thorough (1–5, 5=Extremely)	3.63 (0.95)	3.94 (0.90)	0.306	0.038
Succinct (1–5, 5=Extremely)	3.75 (0.93)	4.24 (0.69)	0.490	0.0005
Synthesized (1–5, 5=Extremely)	3.42 (1.02)	3.78 (1.10)	0.347	0.0136

FEEDBACK TO ACHIEVE SAFE SIGN-OUT TECHNIQUE (FASST)

Jessica Kuester^{1, 3}; Matthew Doers¹; Tessa Damm¹; Erica M. Wozniak¹; Kinsey A. Nattinger¹; Kathlyn Fletcher². ¹Medical College of Wisconsin, Milwaukee, WI; ²Milwaukee VAMC/Medical College of Wisconsin, Milwaukee, WI; ³Clement J Zablocki VA Medical Center, Milwaukee, WI. (Tracking ID #2197422)

BACKGROUND: Hand-offs occur when patient information and responsibility for care are passed from one clinician to another. Due to transition to a hospitalist-based system of inpatient care and recent reductions in house staff work hours, there has been an resultant increase in the number of hand-offs that most inpatients experience. Patient hand-offs typically include a written and verbal component. Based on a previous study, we identified suboptimal written sign-out documents as a potential patient safety problem. We aimed to improve the quality of the written sign-out documents using an audit and feedback intervention.

METHODS: This was a prospective, pre-post quality improvement study. The setting was a large academic hospital. Participants were recruited from the six general internal medicine teaching service teams. Data was collected by downloading sign-out documents of the general medicine ward teams from the electronic medical record for three consecutive weeks during the months of September, October, and November 2013. A previously developed 11-item checklist was used to evaluate the quality of each patient entry on the sign-out document. The first week sign-outs provided the baseline data. During the second week, teams were provided written and verbal feedback on their sign-out document. The third week sign-out documents provided outcome data. Sign-outs were also downloaded and analyzed for one week during December 2013 and June 2014 to evaluate for duration of intervention effect. Non-routine events (NREs) were identified by facilitated survey of the cross-covering house staff and utilized as a patient safety marker. Pre- and post-intervention sign-out score data for each month were pooled and compared by checklist item using a chi-square test, or Fisher's exact test where sample sizes were small. A logistic regression was used to evaluate the pre-post effect of intervention on the presence or absence of an NRE, controlling for sign-out score and the number of patients on each sign-out. A kappa statistic was computed for each checklist item to assess inter-rater agreement between the investigators scoring sign-outs.

RESULTS: A checklist was utilized to score 2321 individual written sign-out entries (552 pre-intervention and 615 post-intervention) in order to evaluate the inclusion of 11 components essential to an effective sign-out. The direct feedback intervention method resulted in highly significant ($p \leq 0.01$) improvement in the percent of sign-outs documenting five of the checklist items (pre, post): mental status (67.0, 80.0 %), decisionality (51.1, 67.5 %), degree of sick (59.1, 68.5 %), absence of confusing or conflicting information (90.9, 95.3 %), and absence of vague language (61.2, 68.1 %). For most checklist items, improvements in sign-out quality were lost by December 2013, and by June 2014, some scores were actually lower than the pre-intervention values. No significant associations were found between occurrences of NREs and written sign-out quality, intervention period, or the number of patients on sign-outs. Nearly all kappa statistics comparing sign-out raters reflected very strong agreement on checklist items, validating the use of multiple raters to evaluate sign-out quality.

CONCLUSIONS: Timely, direct feedback on the written sign-out can improve the quality of the written component of patient hand-offs in the short term. More research is warranted to investigate how frequently such feedback is required to maintain sign-out quality and what factors may have contributed to the demonstrated "June effect." Improvement in the quality of written sign-outs was not found to be associated with an increase in patient safety, but sample size limitations for patient safety outcomes in the current study, as well as the complexity of the patient hand-off process as a whole, support the need for further investigation.

FLAGGING ELEVATED GLUCOSE VALUES IN THE ELECTRONIC MEDICAL RECORD: DOES IT IMPROVE RECOGNITION AND FOLLOWUP OF ABNORMAL VALUES? Zahra Merchant; Kazeen Abdullah; Riya Joshi; Deepa Bhat; Jason Fish; Ethan Halm; Michael E. Bowen. UT Southwestern Medical Center, Dallas, TX. (Tracking ID #2198672)

BACKGROUND: Laboratory values are commonly flagged as abnormal in the electronic medical record (EMR) when they are outside of designated reference ranges. However, the impact of this approach on provider practice and results management is not well understood. Using elevated random blood glucose (RBG) values in routine clinical practice in an academic medical center, we examined follow-up rates of elevated RBG values and hypothesized that providers were more likely to follow-up results that were flagged as abnormal.

METHODS: We conducted a retrospective chart review of non-pregnant adults ≥ 18 years without diagnosed DM who had at least one ambulatory visit between 2011 and 2013. Eligible patients had at least one ambulatory RBG ≥ 125 mg/dL and no resulted hemoglobin A1C test in the 2 years before the RBG value. The RBG ≥ 125 mg/dL threshold was selected based on evidence that RBG values over this threshold can identify DM. Of 367 patients meeting this criteria, we randomly selected 150 charts for in-depth review. Two trained abstractors reviewed half of the charts each using a structured data collection form based on a conceptual model of ambulatory clinical errors. A 10 % random sample ($n=15$) of charts was reviewed by both abstractors and a Kappa statistic was calculated. All data were abstracted from our comprehensive EMR (Epic), which contains data across all care settings. The EMR automatically flags RBG values ≥ 140 mg/dL as abnormal for being outside of the reference range. Lab results are automatically released via the MyChart patient portal to patients 4 days after completion in accordance with the Meaningful Use guidelines. The primary outcome was successful follow-up of RBG values ≥ 140 mg/dL. Success was defined as 1) ordering an A1C within 30 days; 2) a resulted A1C within 12 months; 3) comment on the elevated value by the ordering provider within 30 days; or 4) communication of test results to the patient within 30 days. The primary predictor was the elevated RBG value, divided into 2 groups: < 140 mg/dL (reference group) and ≥ 140 mg/dL. Non-parametric, descriptive analyses were conducted. Multivariate, exact logistic regression was used to evaluate the association between flagged results and successful follow-up, adjusting for the total number of clinic visits and a completed follow-up encounter with the ordering provider within the 12 months after the elevated RBG.

RESULTS: Of 150 charts reviewed, we excluded 53 that did not meet study criteria or had cancer diagnosed within 3 years before the elevated RBG. A total of 97 charts were included in this analysis. The interrater reliability was Kappa=0.73 ($P < 0.002$). The median age was 68.4 years. (53.6–75.4), 29 % had a family history of DM, and 58 % had hypertension. Only 3 % had a diagnosis of pre-DM. Eighty-eight percent had a primary care provider at the academic medical center. In the 12 months following the elevated RBG, the median number of visits was 7 (IQR: 4–11), and 83 % of patients completed a visit with the ordering provider within 12 months after the RBG value was resulted. All results were reviewed by ordering providers a median of 4 (1–17) days after they were resulted. Only about one-third (36 %) of elevated RBGs were followed-up. Twenty percent of patients had more than one elevated RBG. No significant differences in age, sex, race, BMI, or type of ordering provider were observed between the reference group and the ≥ 140 mg/dL group. In unadjusted analysis, follow-up success of the ≥ 140 mg/dL group was not significantly different than that of the reference group (OR=2.2, CI=0.82–5.8, $P=0.13$). In adjusted analyses, those with RBG ≥ 140 mg/dL were more not more likely (OR=2.6, CI=0.91–7.4, $P=0.08$) to have the value followed-up; however, there was a trend towards statistical significance. Although 75 % of patients used the electronic patient portal, automated flagging of RBG values ≥ 140 mg/dL for providers and the release of these flagged, abnormal values to patients via the electronic patient portal was not associated with increased follow-up.

CONCLUSIONS: Overall, follow-up of elevated glucose values is low regardless of whether values are flagged as abnormal or not. In all cases, providers viewed the elevated labs electronically. However, flagging elevated glucose results does not lead to increased follow-up action, and labs were automatically released to patients even if abnormal. Additional studies are needed to understand the results management practices of providers, and improved systems-based interventions are needed to facilitate follow-up of abnormal glucose values.

FOLLOW-UP OF ABNORMAL CHEST CT IN SMOKERS AT HIGH RISK FOR DEVELOPING LUNG CANCER Sanja Percac-Lima²; Jeffrey M. Ashburner²; Dorothy Rimmelin¹; Steven J. Atlas². ¹Harvard Medical School, Boston, MA; ²Massachusetts General Hospital, Boston, MA. (Tracking ID #2198516)

BACKGROUND: Lung cancer is the leading cause of cancer death in the US. Although recommended, lung cancer screening is still not covered by most insurers. However many

high-risk smokers receive chest CTs as part of symptom evaluation. The objective of this study was to assess indication for, and rates of abnormal chest CTs and follow-up of abnormal findings in smokers at high risk for developing lung cancer.

METHODS: In this retrospective study, we reviewed electronic medical records of patients at increased risk for lung cancer (current smokers, aged 55–79 years) who received a chest CT during 2012 in a large, diverse academic primary care network. Data collected included: the order site, indication, results of the CT scan, and the recommendation for follow-up. We excluded patients who had a prior diagnosis of lung cancer, died, or if the end of data collection (June 1, 2014) was prior to the date of recommended follow-up. Our primary outcome was the proportion of patients with timely follow-up of their initial abnormal CT, defined as receiving the recommended test within 30 days of the time period recommended by radiologist. In secondary analyses we compared the follow-up by indication, results, patient characteristics (language, race, insurance), primary care practice type (community health center or not), recommended time to follow up and CT order site and adjusted for age, gender, number of clinic visits over the prior 3-years, and outpatient Charlson comorbidity score in logistic regression models.

RESULTS: Of 3256 smokers at high risk for developing lung cancer, 446 (14 %) had a chest CT during 2012. We excluded 70 patients because they died, were already diagnosed with lung cancer, had their CT scan done elsewhere, or left the primary care network. Among the remaining 376 patients, 90 % (337) had an abnormality noted on chest CT and 55 % (184) had a specific recommendation for follow-up. The recommended follow-up time ranged from 30–365 days with a mean of 177 days (median: 90 days). Among patients with a follow-up recommendation, the mean age was 65.6 years, 55 % were female, 94 % spoke English, 90 % were white, and 16 % had Medicaid or lacked insurance. Fifty-seven percent (105 of 184) of patients received timely follow-up. Patients were more likely to have timely follow-up if the indication for CT was pulmonary disease (28 % of patients with timely follow-up vs. 9 % among those without timely follow-up, $p=0.002$). Patients receiving care in community health centers were more likely than those from non-community health centers to have a timely recommended follow-up (65.6 % vs. 46.0 %, adjusted p -value=0.04). Twenty (11 %) patients never received any follow-up, most commonly due to the presence of serious co-morbid conditions. Of 184 patients with an abnormality and a specific recommendation, 24 had a ‘suspicious malignancy’ CT result and of these all had a follow-up, however in 3 (5 %) it was not within the recommended time. There were no differences in follow-up by order site, insurance, race, language or the time frame recommended for follow up.

CONCLUSIONS: In a time period before screening was recommended for lung cancer using low-dose CT scans, we observed that patients at high risk of developing lung cancer

often did not receive the follow-up of an abnormal chest CT findings within the recommended time frame. Lung cancer screening is a complex process and will often require follow-up testing. In addition to identifying those individuals who are most likely to benefit from lung cancer screening, these results highlight the need for developing systems to identify, track, and support patients to obtain recommended follow-up to ensure that the benefits of screening identified in clinical trials are translated to usual clinical practice.

FOOD ENVIRONMENT, DIET BEHAVIOR AND WEIGHT GAIN IN A MULTI-ETHNIC URBAN COHORT Pooja A. Lagisetty¹; Rebecca Piccolo³; May Yang³; Lisa D. Marceau³; Richard W. Grant¹; John B. McKinlay³; James B. Meigs². ¹Kaiser Permanente Northern California, Oakland, CA; ²Massachusetts General Hospital, Boston, MA; ³NERI, Watertown, MA; ⁴University of Michigan, Ann Arbor, MI. (Tracking ID #2198103)

BACKGROUND: The relationship between lack of neighborhood healthy food access and increased obesity has led to a sharp increase in policy initiatives focused on improving local access to healthier food sources in poorer communities. We tested the hypothesis that geographic proximity to healthier food stores is associated with healthy diet behavior and a decrease in weight gain over time.

METHODS: Body weight and diet behavior were measured on 3136 participants in the Boston Area Community Health (BACH) Survey at baseline (2002–2005) and follow-up in (2010–2012). Boston city food environment was mapped using ArcGIS software. Food access with relationship to subjects’ home address was defined as low (>0.5mi) and high access (<0.25mi). Diet behavior was measured with a Block food frequency questionnaire and assessed with a diet score derived from AHA and ADA guidelines. Linear regression models predicted percent weight change over time associated with proximity to food environment, access and dietary behavior.

RESULTS: The mean weight was 82.8 kg at baseline and the mean percentage weight change from 2002 to 2010 was +2.44 % (SE=0.36 %). There was no statistically significant ($P<0.05$) relationship of low or high healthy eating scores or percent weight gain over a mean 7.3 years with low or high low access to fast food stores, convenience stores, or grocery stores and supermarkets. Accounting for car ownership did not alter the results.

CONCLUSIONS: Efforts to reduce obesity in poorer communities may need to focus on other aspects of healthy eating in addition to food store access.

Beta coefficient and 95 % confidence intervals for continuous measures of percent weight change for each level of access to food environment

Model No.	Covariate Adjustment	Low Access (>0.50 mi) ^a	High Access (<0.25mi) ^a	P-value
Convenience Stores				
Model 1	Unadjusted	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.212
Model 2	Age, gender, education, income occupation, physical activity	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.105
Model 3	Age, gender, education, income occupation, physical activity, and diet	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.098
Model 4	Age, gender, education, income occupation, physical activity, diet, and race	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.141
Fast Food Stores				
Model 1	Unadjusted	0.98 (0.95,1.00)	0.98 (0.95,1.00)	0.131
Model 2	Age, gender, education, income occupation, physical activity	0.98 (0.95,1.00)	0.98 (0.95,0.98)	0.138
Model 3	Age, gender, education, income occupation, physical activity, and diet	0.98 (0.95,1.00)	0.98 (0.95,0.98)	0.138
Model 4	Age, gender, education, income occupation, physical activity, diet, and race	0.98 (0.95,1.00)	0.98 (0.95,1.00)	0.152
Grocery Stores and Supermarkets				
Model 1	Unadjusted	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.254
Model 2	Age, gender, education, income occupation, physical activity	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.318
Model 3	Age, gender, education, income occupation, physical activity, and diet	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.317
Model 4	Age, gender, education, income occupation, physical activity, diet, and race	1.02 (0.98,1.07)	1.02 (1.00,1.05)	0.345

^amedium access (0.25–0.50 miles) reference group, the antilog of the beta coefficients are presented.

FOOD INSECURITY IS ASSOCIATED WITH PERIPHERAL ARTERIAL DISEASE IN OLDER ADULT POPULATIONS Michelle L. Redmond¹; Fanglong Dong¹; Jeannine Goetz, PhD²; Lisette T. Jacobson¹; Tracie C. Collins¹. ¹KU School of Medicine - Wichita, Wichita, KS; ²University of Kansas Medical Center, Kansas City, KS. (Tracking ID #2197858)

BACKGROUND: Food insecurity, defined as the limited or uncertain availability of nutritious and safe foods, is linked to poor nutrition and diet-sensitive chronic diseases. Food insecure individuals often have dietary patterns that include less nutrient-rich foods, increased consumption of saturated fats and meat products which are potential risk factors for the progression of peripheral arterial disease (PAD). Food insecurity among older

adults with diet-sensitive chronic disease impacts health negatively because lack of availability to nutritious and safe foods can exacerbate health conditions such as diabetes and hypertension, which are risk factors for PAD. Because PAD prevalence increases with age, this study explored whether a relationship exists between food insecurity and PAD among a national sample of older adults.

METHODS: The authors conducted a cross-sectional data analysis using data from the 1999–2004 National Health and Nutrition Examination Survey. All participants with PAD were included (ankle brachial index [ABI] score ≤ 0.90) as well as those with borderline disease (ABI 0.91 to 0.99). Participants were excluded from the analysis if they: were less than 60 years of age, did not report both the left and right ABI score, did not report family poverty income ratio, and did not complete the food security survey module. The US

Household Food Security Survey Module, an 18-item validated instrument, was used to measure household food security level during the previous 12-month period. Similar to other studies on food insecurity, our study utilized the first 10-items, which addressed adult food security. Bivariate analyses were conducted using the Rao-Scott Chi-square test to examine associations between PAD and sociodemographic variables. Multivariable survey logistic regression was employed to assess the effect of food insecurity on the presence of PAD, with adjustment for respondent's sociodemographic characteristics. Survey weights were utilized to account for survey non-response, over-sampling, post-stratification, and sampling error.

RESULTS: A total of 2017 older adult respondents from 1999–2004 NHANES were included in the final analysis. A majority of respondents (84.8 %) were food secure, thus experiencing no problems or anxiety with accessing adequate and safe foods. More than half (60.7 %) of respondents were female, 75 % were non-Hispanic white, 14.4 % were current smokers, 55.1 % had hypertension, 17.5 % had diabetes mellitus, 44.6 % had high cholesterol, 30.3 % had PAD and the average age was 71.9 years. Our study found food insecurity was associated with PAD among older adults (adjusted odds ratio, 1.97, 95 % CI=1.11–2.03). Additionally, adults ≥ 70 years of age with PAD (ABI ≤ 0.90) or borderline disease (ABI 0.91 to 0.99), had a higher percentage of food insecurity than those with no PAD ($p=0.027$). The fully adjusted model suggests that respondents were more likely to develop PAD if they were non-Hispanic black (OR=1.5, 95 % CI=1.11–2.03), a current smoker (OR=2.81 95 %, CI 2.01–3.93), a previous smoker (OR=1.60, 95 % CI=1.23–2.07), had hypertension (OR=1.73, 95 % CI=1.34–2.22), had diabetes mellitus (OR=1.73, 95 % CI=1.31–2.28), and/or high cholesterol (OR=1.22, 95 % CI=1.00–1.49).

CONCLUSIONS: Older adults with definite as well as borderline PAD experience food insecurity. While the association between nutrition and PAD is not well-defined, there is some literature to suggest an association between food insecurity and diet-sensitive chronic diseases (diabetes and hypertension) which are risk factors for PAD. Future work should address the role of addressing food insecurity among older adults to reduce the risk for and/or progression of PAD. Supported by Grant No.3R01HL098909-04S1

FOOD INSECURITY, FOOD DESERTS, AND GLYCEMIC CONTROL: A MULTI-LEVEL LONGITUDINAL ANALYSIS Seth A. Berkowitz¹; Steven J. Atlas²; Lily Barnard³; Carine Y. Traore²; James B. Meigs²; Deborah J. Wexler². ¹MGH, Boston, MA; ²Massachusetts General Hospital, Boston, MA; ³Tufts University, Medford, MA. (Tracking ID #2191915)

BACKGROUND: Food insecurity, defined as limited access to food owing to cost, and residence in a food 'desert', an area with limited options to purchase fresh foods, have both been associated with adverse diabetes outcomes. Recently, there have been significant investments in interventions that expand neighborhood food access, while nutritional assistance programs have seen spending cuts. To determine possible implications of this for diabetes management, we sought to determine the variation in glycemic control explained by both patient-level and area-level factors.

METHODS: We conducted a longitudinal cohort study from June 1, 2013 to December 1, 2014. A random sample of diabetes patients who were empanelled in the same primary care network completed the 6-item Food Security Survey Module in English or Spanish. Patients with ≥ 2 affirmative responses were considered to have food insecurity. We analyzed food insecurity as a patient level variable, as is common in this type of research, although it affects the entire household. We abstracted sociodemographic and clinical information from the electronic health record. Patient addresses were geocoded to census tracts using the U.S. Census' MAF/TIGER database. We used the 2014 U.S. Department of Agriculture's Food Access Research Atlas to determine if a patient's residence was in a food desert census tract. Our primary outcome was hemoglobin A1c (HbA1c). We performed descriptive statistics using chi-squared and t-tests. We then assessed the association between food insecurity, residence in a food desert, and baseline glycemic control using hierarchical linear models (SAS PROC MIXED) with census tract-level random effects. We calculated intraclass correlation coefficients (ICC) to partition the variation in glycemic control between patient-level and census tract-level factors. Finally, we used longitudinal hierarchical models, with patient-level and census tract-level random effects, to determine the association between food insecurity, residence in a food desert, and subsequent glycemic control.

RESULTS: We enrolled 411 patients: mean age was 62 (SD: 12) years, 47 % were women, 79 % were non-Hispanic white, and 14 % had not graduated high school. Twenty percent reported food insecurity, and 29 % lived in a food desert. Patients who reported food insecurity were more likely to live in a food desert than those who did not (36 % vs. 27 %, $p=.04$). At baseline, food insecurity was associated with greater HbA1c (7.8 % vs. 7.2 %, $p=.02$); living in a food desert was not (7.3 % vs. 7.2 %, $p=.69$). Based on the ICC, census tract-level variables, such as residence in a food desert, explained only 4 % of the variation in HbA1c. In hierarchical models adjusted for age, gender, race/ethnicity,

education, insurance, Charlson comorbidity score, duration of diabetes, health literacy, nativity, survey language, diabetes medications, and residence in a food desert, food insecurity remained associated with greater HbA1c (0.5 % greater, 95 % CI 0.1 to 0.9 %). Residence in a food desert was not associated with greater HbA1c (0.0 % difference, 95 % CI -0.4 to 0.3 %). In longitudinal analyses, based on the ICC, census tract characteristics explained only 6 % of the variation in HbA1c over time, while patient-level characteristics explained 74 %. In longitudinal hierarchical models adjusted for the same covariates as the baseline models, food insecurity was associated with greater increase in HbA1c over time (0.24 %/year greater increase in those with food insecurity, 95%CI 0.05 to 0.48 %, $p=.02$), while residence in a food desert was not (-0.12 %/year change in HbA1c, 95%CI -0.24 to 0.12 %).

CONCLUSIONS: Variation in glycemic control was largely explained by patient-level factors. While food insecurity was significantly associated with both greater HbA1c at baseline and increase in HbA1c over time, residence in a food desert was not. Interventions that seek to increase neighborhood food access may have limited impact on glycemic control if they are not coupled with efforts to reduce food insecurity.

FREQUENCY AND CAUSES OF DELAYS IN HOSPITAL DISCHARGE FROM A SAFETY-NET HOSPITAL AFTER MASSACHUSETTS' NEAR UNIVERSAL COVERAGE REFORM Judy Y. Kwok; Paula Lueras; Dylan Bothamley; Jennifer Huang; Carolyn Koulouris; Amy Pasternack; Christina Phillips; Rebecca Rogers; Neil N. Shah; Gaurab Basu; Danny McCormick. Harvard Medical School / Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2171529)

BACKGROUND: Patients often stay in acute care hospitals longer than medically necessary. Non-medically justified days of hospitalization, often un-reimbursed, can create economic pressure on financially struggling hospitals such as safety net hospitals. These days can also decrease bed availability for the acutely ill and increase the risk of iatrogenic illness. Prior research has shown that a common cause of discharge delay is the lack of insurance, particularly among patients requiring post-discharge home- or facility-based care (HFC) such as a skilled nursing facility (SNF), rehabilitation hospital, psychiatric facility, or home care services. However, anecdotal evidence has suggested that even patients having insurance may face discharge delays if they require HFC that is not fully covered or they have complex clinical or social challenges (opiate use, homelessness, behavioral problems, e.g.) less desirable to non-acute care facilities. Massachusetts' 2006 health reform law provided "near-universal" coverage to state residents. No prior studies have examined the frequency or cause of delays in hospital discharge at safety net hospitals, particularly in the setting of "near universal" coverage that could diminish such delays.

METHODS: Data were prospectively collected on 850 consecutive hospital discharges (accounting for 2309 hospital days) from the adult general medicine service at the second largest acute care safety-net hospital in Massachusetts during the period of October 2013 to February 2014. For each day of hospitalization, a research team member recorded if the day was medically necessary, as determined by the treating physician during daily morning multidisciplinary rounds that employed a robust discharge planning process involving social workers and case managers. Patients designated as medically cleared for discharge but who were not discharged on that day were considered to have a non-medical delay; for each such day, the consensus reason for delay articulated by team members in multidisciplinary rounds was recorded. Demographic information including insurance type was extracted from the medical record. We calculated the frequency of delays in discharge, tabulated the reasons for delays, and examined the insurance status of patients requiring post-discharge HFC.

RESULTS: Of 850 patient discharges, 487 were age < 65 and 363 were 65 or older. The majority of patients were insured (96.2 %) with most having Medicare (46.3 %) or Medicaid (29.3 %); only 12.1 % of patients were privately insured. Most patients were discharged to home (65.3 %) but discharge to settings for HFC was common (29.6 %). Of all study patients, 15.1 % experienced a delay in discharge, with delay days accounting for 11.7 % of all hospital days. Among patients discharged to HCF ($n=252$), 30.1 % experienced a delay, nearly all of whom had Medicare or Medicaid (94.1 %). Among patients age < 65 , most common reasons for delayed discharge were unavailability of inpatient psychiatric beds (29.8 %), unavailability of SNF beds (26.6 %), or an unsafe home environment (8.9 %). Among patients age ≥ 65 , the most common reasons for delayed discharge were unavailability of SNF beds (42.1 %), Medicare's 3-day stay requirement (10.3 %), and lack of guardianship determination (10.3 %). Few, if any, reasons were under the control of the hospital; most were related to external health care system factors and, to a lesser extent, patient factors.

CONCLUSIONS: In this acute care safety-net hospital, many patients experience non-medically justifiable delays in hospital discharge, with a significant proportion of all hospital days being attributable to such delays. In the post-reform era, lack of health

insurance played little role in delays; the most commonly identified reasons for delays were the unavailability of post-discharge care facilities even though the vast majority had Medicare or Medicaid. Further research should explore barriers to hospital discharge of publicly insured patients to post-acute care facilities and to home with services.

FREQUENCY OF FOLLOW UP IMAGING RECOMMENDED BY RADIOLOGISTS AND THE IMPACT ON CLINICAL TREATMENT PLANS Owen W. Hanley¹; Tiara Sanborn¹; Amir Lotfi²; Poornima Manikantan¹; Janice Fitzgerald¹; Linda J. Canty³; Mihaela S. Stefan¹. ¹Baystate Medical Center, Springfield, MA; ²Baystate Medical center, Springfield, MA; ³Tufts University School of Medicine / Baystate Medical Center, Springfield, MA. (Tracking ID #2198910)

BACKGROUND: The increase in overall healthcare expenditure in the U.S. has recently been addressed in the *Choosing Wisely* campaign amongst a variety of subspecialties in an effort to decrease overall healthcare costs and minimize patient morbidity, while maintaining high quality care. There has been little research on the prevalence of radiology follow-up studies recommended by radiologists and the impact these have on clinical decision making and patient outcomes. Objective: To assess the rate and impact of follow up imaging on final diagnosis and treatment plan.

METHODS: We performed a retrospective study of all abdominal, pelvic and chest CT scans performed in patients >18 years of age between September 1, 2010 to December 31, 2010 at one academic tertiary care hospital with 750 bed capacity. The dictated radiology interpretation from an index CT scan was appraised by 3 clinical investigators. We recorded radiological findings pertaining to the ordering physicians' clinical question, other incidental radiologic findings as well as recommendation for further imaging or procedure. If further imaging was recommended, the electronic medical record was reviewed to assess if the additional imaging was performed during that hospital course. If further imaging was pursued, we reviewed clinicians' notes to assess the impact on diagnosis, treatment or clinical decision making. A standardized assessment form was piloted for approximately 10 % of the total CT scans reviewed until there was a perfect agreement between the investigators. Statistical methodology included a description of the findings.

RESULTS: Of the 441 CT scans reviewed, 58 % were of the abdomen/pelvis and 42 % of the chest. Potentially relevant findings were reported by radiologists in 79 % of the scans. Of the scans surveyed, a follow up radiological image or procedure was recommended in 15 % of cases. Of the 67 cases where follow up imaging was recommended, 50 % were for incidental findings rather than the primary indication for the scan. Follow up was performed in 24 (36 %). Of these scans: – 25.0 % confirmed the initial diagnosis and did not change the treatment plan – 20.8 % confirmed a questionable diagnosis and did change the treatment plan – 12.5 % identified alternative pathology that altered the treatment plan – 41.7 % imaging was both therapeutic and diagnostic. There were 43 scans (64 %) in which the recommended follow up imaging was not performed: – 13.6 % were felt to not be clinically relevant by primary clinical team – 34.1 % were deferred for outpatient follow up – 13.6 % an alternate clinical decision or intervention was pursued – 40.9 % there was insufficient information about why the recommended scans were not performed.

CONCLUSIONS: Compared to findings in prior studies where radiologists recommended further imaging in approximately one third of radiology reports, the radiologists in our institution seemed to recommend further imaging less frequently. We found that the recommended imaging was only performed in one third of the cases, though when it was performed it changed management or resulted in a therapeutic procedure in three fourths of cases. The rate of follow-up scans performed in our study does not account for those performed later by outpatient clinicians, therefore is likely an underestimate.

FREQUENT USERS OF THE EMERGENCY DEPARTMENT IN A UNIVERSAL HEALTH COVERAGE SYSTEM: A RANDOMIZED CONTROLLED TRIAL OF A CASE-MANAGEMENT INTERVENTION Patrick Bodenmann^{1, 2}; Dr. Venetia-Sofia Velonaki^{3, 4}; Stéphanie Baggio⁵; Dr. Katia Iglesias^{6, 7}; Dr. Karine Moschetti^{8, 9}; Ornella Ruggeri³; Dr. Olivier Hugli¹⁰; Prof. Bernard Burnand⁷; Prof. Jean-Blaise Wasserfallen^{8, 9}; Francis Vu¹; Prof. Jean-Bernard Daeppen¹¹. ¹Vulnerable Population Center, Lausanne, Switzerland; ²University of Lausanne, Lausanne, Switzerland; ³Department of Community Medicine and Public Health, Lausanne, Switzerland; ⁴Lausanne University Hospital, Lausanne, Switzerland; ⁵Life Course and Social Inequality Research Center, Faculty of Social and political Sciences, University of Lausanne, Lausanne, Switzerland; ⁶Center for the Understanding of Social processes, University of Neuchâtel, Neuchâtel, Switzerland; ⁷Institute of Social and Preventive Medicine, Lausanne University Hospital, Lausanne, Switzerland; ⁸Health Technology Assessment Unit, University of Lausanne, Lausanne, Switzerland; ⁹Institute of Health Economics and Management, University of Lausanne, Lausanne, Switzerland; ¹⁰Emergency Department,

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BACKGROUND: Frequent emergency department users in developed countries represent a relatively small group of patients (4 to 8 %) but account for a disproportionately high number of all emergency department attendances (21 to 28 %), contributing to overcrowding, generating high health-care costs, and calling into question the appropriateness of their visits. Few interventions aimed at improving the management of such users have been proved effective in reducing emergency department use. Our study tested the hypothesis that an interdisciplinary case-management intervention—compared to standard emergency care—reduces emergency department attendance through a better orientation in the Swiss universal health coverage system.

METHODS: In this randomized controlled trial, adult frequent emergency department users (5 or more visits during the previous 12 months) who visited the emergency department of the University Hospital of Lausanne, Switzerland between May 2012 and July 2013 were allocated either to the case-management intervention ($N=125$) or to standard emergency care ($N=125$) and were monitored for 12 months (at 2, 5.5, 9, and 12 months). Randomization was computer generated and concealed, and patients and the research staff were blinded to the patient's allocation, while the case-managers were obviously not blinded. Participants in the intervention group, additional to standard emergency care, received a case management intervention including: – counseling, based on principles of motivational interviewing, focused on social determinants of health and the use of medical care services; – assistance in obtaining income entitlements, better health insurance coverage, stable housing, and schooling for children, and in preventing potential violence in the home; – referral to mental health services, substance abuse services, and primary care providers. This intervention was carried out by an interdisciplinary (four nurse practitioners and a general practitioner/supervisor), mobile team at baseline, and at 1, 3, and 5 months later, in the ambulatory care setting, the hospital, or at patients' place of residence. In between the consultations, the patients had the opportunity to contact—at any moment—the case management team. Participants in the control group received standard emergency care. A generalized, linear, mixed-effects model for count data (Poisson distribution) was applied to compare the participants' number of visits to the emergency department during the 12 months (Period 1) preceding recruitment to the number of visits during the 12 months of monitoring (Period 2). The participants' groups (intervention or control), the period (Periods 1 or 2), and the interaction of these two variables were used as independent variables; age, gender, education level, fluency in French, income, social determinants, somatic and mental indicators, and risk behaviors were used as controlled variables. Results are reported according to an intention-to-treat analysis.

RESULTS: At 12 months of follow-up, data were completed for 115 participants in the intervention group and 115 in the control group ($N=230$, deaths: 10 in each group). The mean age of participants was 45.1 (± 17.9), 50 % were Swiss, and the majority were male (57 %), French speaking (80 %), and with low educational level (70 %); 43 % were dependent on social welfare; the majority suffered from somatic (69 %) or mental (50 %) health issues; and 33 % presented risk behaviors (tobacco, alcohol, drugs, sexual risks, or violence). The number of emergency department visits was lower during Period 2 compared to Period 1 for both groups ($b=-0.56$, $p<0.001$) but the decrease was significantly more important for the intervention group ($b=-0.025$, $p=0.012$). Whether a participant was in the control or intervention group was not, itself, found to have an impact on the number of visits ($b=-0.02$, $p=0.821$), which means both groups were comparable with regards to the number of emergency department visits during the 12 months preceding recruitment (Period 1).

CONCLUSIONS: This study strengthens the evidence that a case-management intervention leads to a reduction in emergency department use by frequent emergency department users, through their improved orientation in a universal health coverage system. Because, as in other developed countries, total numbers of emergency department visits in Switzerland (around 1.6 million per year) have been steadily growing, our findings should have policy implications for the generalization of such teams on a larger scale nationally, and in other countries with universal health coverage, taking into account the impact on patients (in terms of trust, perceived discrimination, quality of life, and health indicators) and the financial resources required.

FRIEND OR FOE: FACULTY, RESIDENT AND PATIENT PERCEPTIONS OF IPAD USE IN THE INPATIENT SETTING Wei Wei Lee²; Lollita Alkureishi²; Valerie G. Press²; Micah Prochaska²; Paul Bergl¹; David Meltzer²; Vineet M. Arora². ¹Medical College of Wisconsin, Milwaukee, WI; ²University of Chicago, Chicago, IL. (Tracking ID #2196130)

BACKGROUND: Use of tablet computers in the hospital is becoming more common. Unfortunately, studies show interns spend much more time in front of a screen than in

direct patient care. Further, while iPad use in residency programs is increasing, it is unclear how physicians and patients perceive iPad use affecting doctor-patient communication.

METHODS: We surveyed internal medicine residents (IMR) and attendings (general internists and hospitalists) on perceptions of iPad use and the impact on patient-doctor communication at various conferences. Patient perceptions were assessed in an ongoing survey study of resource-allocation and quality of care among inpatients. Likert responses at the high end of the scale were grouped to dichotomize data (i.e. agree/strongly agree). Descriptive statistics were used to summarize the data and 2 sample tests of proportion were used to explore resident-faculty differences in perceptions.

RESULTS: Thirty-nine faculty [GIM: 30/32 (94 %); HM: 9/11 (82 %)] and 90 resident (90/101, 89 %) surveys were analyzed. Almost all faculty [95 % (36/38)] reported residents used iPads, but only 18 % (7/39) reported using iPads in the hospital themselves. Both faculty and residents agreed that resident iPad use improved patient care (87 % (33/38); 60 % (54/90) respectively) and efficiency (97 % (37/38); 86 % (77/90) respectively). Faculty were more likely to perceive that residents spend more time with this technology than with patients [76 % (29/38) vs. 29 % (26/90), $p < 0.001$]. While 40 % (36/90) of residents agreed that iPad use 'allows them to spend more time at the patient's bedside providing patient education', less than a third [27 % (24/90)] reported frequent (≥ 4 /month) use of iPads to 'educate patients about medical conditions.' About 1/3 [29 % (26/90)] of residents reported that iPad use negatively impacts their ability to communicate with patients. Few [39 % (35/90)] residents 'were confident in their ability to use the iPad in a patient centered manner.' Eighty-four patient surveys (94 %, 84/89) were analyzed. Only 1 patient (1 %, 1/84) agreed that 'doctors spent more time with computers or mobile devices than with me'. Only a quarter of patients (23 %, 19/84) agreed that their 'physicians used the computer or mobile devices to provide education.'

CONCLUSIONS: While both faculty and residents agreed that resident iPad use improves patient care and efficiency, faculty were more likely to perceive that iPads took residents away from the bedside. Interestingly, patients did not perceive that physicians spent more time with devices than with them. One-third of residents felt iPad use hampers their ability to communicate with patients and few were using the iPad to educate patients. Only a minority of residents were confident in their ability to use the iPad in a patient-centered manner. Our findings highlight the need to train providers to optimize use of iPads to engage patients at the bedside.

FROM PAST TO PRESENT: CONTINUITY OF CARE IN A RESIDENT CLINIC AFTER A 4+1 BLOCK SCHEDULE IMPLEMENTATION Halle G. Sobel; Charita Vadlamudi. FAHC, Burlington, VT. (Tracking ID #2159920)

BACKGROUND: Continuity of care is considered to be an important aspect to providing good clinical care in the outpatient setting. During residency training, there are many barriers that challenge resident and patient continuity in ambulatory clinics. Leaders in Internal Medicine have called for ambulatory redesign with block scheduling models and clinics are now in a position to evaluate the impact of these innovations. This was the case in the Internal Medicine program at the University of Vermont Medical Center (UVMC) which followed a traditional ½ day a week ambulatory clinic model until July 2012. The program was restructured in July 2012 to a 4+1 system in which resident physicians alternated with 4-week blocks of inpatient and elective rotations and a 1-week block of dedicated ambulatory care. This allowed residents to be in clinic consistently every 5 weeks. Our study will determine if continuity of care has improved, stayed the same or declined between resident physician and patient with the new block model.

METHODS: The UVMC Internal Medicine Residency program consists of 35–41 categorical residents each year who were all included in this study. Residents attend one continuity clinic site at the University Health Center Given Clinic. The traditional ½ day per week of outpatient clinic for each resident was in place until July 2012 after which the new 4+1 system was implemented. Each resident had an assigned panel of patients that averaged from 50 to 80 patients. During the clinic week, time was divided into continuity clinic, didactic, and subspecialty clinic sessions. During the continuity clinic sessions, residents saw patients from their own panel as well as acute visits for patients assigned to a different resident or attending primary care physician (PCP). In this study, continuity of care was measured for each patient who attended the resident clinic with an assigned resident PCP. Data regarding patient visits was gathered using EPIC and the GE scheduling system. This project was approved by the University of Vermont institutional review board (IRB) as Not Human Subject Research. Data were collected on patient visits only if the patient had an assigned resident physician as their PCP. For each of the patients, the total numbers of visits to the clinic were collected for the three periods of time: July 2011-June 2012, July 2012-June 2013, and July 2013-June 2014. From these visits, we delineated the number of visits the patient had with their assigned

resident PCP. Patients who had no visits during any given year were excluded from the study.

RESULTS: A total of 199 patients met criteria for the study. There were 838, 817, 791 total patient visits during July 2011-June 2012, July 2012-June 2013, and July 2013-June 2014 respectively. The Usual Provider of Continuity Index (UPC) is a measure of continuity that is calculated by dividing the number of visits to the same provider by the total number of visits to the clinic. For July 2011-June 2012: UPC 0.0059, July 2012-June 2013: UPC 0.0942, and July 2013-June 2014: UPC 0.4045

CONCLUSIONS: The results from our study show that the continuity of care improved in the 4+1 system when compared to the traditional system. Furthermore, there was large improvement in continuity during the July 2013-June 2014 period (year 2 of 4+1 system) from July 2012-June 2013 (year 1 of 4+1). In addition to the block model, this improvement in year 2 could also be attributed to increased education for staff on the importance of scheduling patients with the resident physician and also improvements in EPIC that allowed for easier identification of the PCP resident on the patient banner of each chart. Furthermore, residents were consistently encouraged to make follow-up appointments with their own patients. These results are exciting as the structure of the ambulatory week evolves and allows faculty to train residents in ambulatory population management and other emerging topics. It is hopeful that residents may find continuity clinic a more satisfying experience as they develop the resident-patient relationship and have more time to reflect on this partnership. The future is rich for areas to study including whether or not such improved continuity improves patient care outcomes and improves residents entering the field of ambulatory general internal medicine.

FUNCTIONAL STATUS, SOCIAL SUPPORT AND WEALTH IMPACT READMISSIONS FOR PNEUMONIA AND HEART FAILURE BEYOND STANDARD MEDICARE RISK-ADJUSTORS Jennifer Meddings¹; Heidi Reichert¹; Shawna N. Smith¹; Theodore Iwashyna^{2, 1}; Kenneth M. Langa^{1, 2}; Timothy Hofer^{2, 1}; Helen McGuirk¹; Laurence F. McMahon^{1, 3}. ¹University of Michigan, Ann Arbor, MI; ²Ann Arbor VA Medical Center, Ann Arbor, MI; ³University of Michigan School of Public Health, Ann Arbor, MI. (Tracking ID #2198274)

BACKGROUND: Hospital rates of unplanned Medicare readmissions within 30 days of discharge for pneumonia and heart failure are publicly reported on 'Hospital Compare' by the Centers for Medicare and Medicaid Services (CMS) and used to assess value-based purchasing hospital payments and penalties for hospitals. These readmission rates are "risk-adjusted," accounting for age, gender and medical comorbidities available within Medicare claims data. We hypothesized that patient functional status, social support and wealth also impact unplanned readmission rates beyond standard CMS risk-adjustors.

METHODS: Two data sets were used and linked for this analysis to study adults aged 65 years and older with Fee-for-Service Medicare and available data over the period 1995 to 2012. Patient-level Medicare claims data described inpatient, outpatient and home health care services and diagnoses. The nationally representative Health and Retirement Study (HRS) is an ongoing biennial prospective cohort study of more than 35,000 older adults' physical health and functioning, finances and social support. We developed logistic regression random-intercept models to assess the impact of functional status, social support and wealth (as assessed in the HRS survey most recent to the index admission) upon readmissions for any cause after an index admission for pneumonia or heart failure, beyond the patient characteristics (age, gender, comorbid diagnoses) and inclusion/exclusion criteria in current CMS readmission models. Functional status was assessed by number of limitations with activities of daily living (ADLs), categorized as 1–2 ADL difficulties, or 3+ ADL difficulties compared to no difficulties. Categorical social support measures included spousal support (comparing spouses with <3 ADL difficulties or 3+ difficulties with no spouse) and having children. Other controls and measures in the model included whether the patient was a nursing home resident at the time of the HRS survey prior to admission and whether home health care was used within the 2 years prior to the HRS survey. A measure of total wealth was also studied. Time, patient race and comorbid conditions (including age and gender) were also included. Hospital-level characteristics were not available. Likelihood ratio tests were used to compare nested models. A significance level of 0.05 was used.

RESULTS: Among 1782 index admissions for pneumonia, there were 272 (15.3 %) unplanned readmissions within 30 days of discharge after the index admission. HRS interview data had been collected a mean of 509 days (median 431) prior to the index pneumonia admission. Pneumonia patients with 3+ ADL difficulties were found to have significantly greater odds of readmission (OR=1.5; 95 % CI: 1.0–2.1), as were African American patients (OR=1.7; CI: 1.1–2.6), and patients that used home health care in the past 2 years (OR=1.6; CI: 1.1–2.2). Unexpectedly, pneumonia patients with a spouse having <3 ADL difficulties (OR=1.4; CI: 1.0–1.9) or with children (OR 2.1; CI: 1.1–4.1) also had significantly greater odds of readmission. A likelihood ratio test comparing our

full model to the current CMS pneumonia readmission model showed a significant improvement in fit ($p < 0.0001$). The full model's performance (c-statistic 0.78) was improved compared to the current CMS pneumonia readmission model (c-statistic of 0.64). Among 2271 index admissions for heart failure, there were 530 (23.3 %) unplanned readmissions within 30 days of discharge. Readmission rates after index admissions for heart failure decreased significantly over the study period. HRS interview data had been collected a mean of 510 days (median 430) prior to the index heart failure admission. Functional status, spouse characteristics, having children and previously requiring nursing home or home health care services were not associated with rates of readmissions after a heart failure admission. Greater wealth (square root of \$000 s, OR 0.988; CI: 0.977–0.999) was associated with lower odds of readmission. A likelihood ratio test comparing our full model to the current CMS health failure readmission model showed a significant improvement in fit ($p = 0.03$). The full model's performance (c-statistic 0.69) was improved compared to the current CMS heart failure readmission model (c-statistic of 0.61).

CONCLUSIONS: Patient functional status, spouse functional status, having children and prior needs for home health care were each associated with greater odds of readmission in the pneumonia cohort, but not for the heart failure cohort. Greater wealth was associated with lower odds of readmission for the heart failure cohort. Our findings suggest that CMS should consider accounting for functional status, social support and wealth in models used to compare hospital performance by readmission rates since they are associated with the outcome of interest, are often factors outside the control of the hospital, and are well known to be unevenly distributed across hospitals.

GENDER DIFFERENCES IN COPING MECHANISMS IN INTERNAL MEDICINE RESIDENTS Brielle Spataro¹; Sarah A. Tilstra³; Melissa McNeil². ¹UPMC Presbyterian Hospital, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA; ³University of Pittsburgh School of Medicine/Medical Center, Pittsburgh, PA. (Tracking ID #2192407)

BACKGROUND: Physician burnout is a syndrome characterized by emotional exhaustion, depersonalization and a low sense of personal accomplishment. It affects physicians in all levels of training. Burnout can erode professionalism, influence quality of care and increase risk for medical errors. Burnout is thought to affect genders differently. Studies have shown no gender differences in frequency of burnout but higher rates of emotional exhaustion in women and depersonalization in men. Burnout results from recurrent exposure to stressful experiences. Coping mechanisms are behavioral and psychological efforts that people use to deal with stress. The relationship between burnout and coping mechanisms is unknown, and little data exist regarding gender differences in the use of coping mechanisms. Objective: Evaluate for gender differences in burnout and use of coping mechanisms among internal medicine residents.

METHODS: Cross-sectional survey data was analyzed from 100 male and 98 female internal medicine residents at a large academic center in June 2014. This sample included all PGY-1, 2 and 3 internal medicine, transitional, and medicine-pediatrics residents. Residents completed the Maslach Burnout Inventory-General Survey (MBI-GS) and the Brief Cope as part of a series of mandatory residency program requirements. The MBI-GS measures burnout in three scales: emotional exhaustion, cynicism and professional efficacy. It's validated in healthcare professionals. The results are divided into high, moderate and low levels of burnout based on the normative distribution of doctors and nurses. The Brief Cope is a 28-item instrument measuring the frequency of 14 different coping mechanisms on a 4-point Likert-type scale. It is widely used in the literature and has good reliability in many different populations. Descriptive statistics were used to determine the percentage of residents that met criteria for "high" levels on each of the MBI-GS subscales. Score cutoff levels were for emotional exhaustion ≥ 3.2 , cynicism ≥ 2.2 and professional efficacy ≤ 4.00 (reverse scale). The Brief Cope results were analyzed by mean frequencies of each of the 14 coping mechanisms measured in female and male residents (range 2–8). Two sided t-tests were used to calculate p values. There was a 100 % completion rate of both instruments.

RESULTS: Overall 16 % of residents had high levels of emotional exhaustion, 18 % with high levels of cynicism and 22 % had low professional efficacy. Compared to males, females experienced a significantly higher incidence of emotional exhaustion (22 % vs 9 %, $p < 0.005$), and a reported higher levels of cynicism, (22 % v. 13 %, $p = 0.13$), although this was not significant. There was no gender difference in sense of professional efficacy (22 % vs. 22 %, $p = 0.50$). As for coping mechanisms, the use of emotional support, the use of instrumental support and self-blame were more frequent in female residents. The use of humor was more frequent in male residents. There were no statistically significant differences in the frequency of use of other coping mechanisms (Table).

CONCLUSIONS: Female internal medicine residents report higher levels of emotional exhaustion, and use emotional support ("seeking comfort and understanding"),

instrumental support ("seeking advice"), and self-blame ("criticizing and blaming oneself") more frequently than their male colleagues. While using emotional and instrumental support coping mechanisms are often thought of as protective, self-blame can be a maladaptive pattern of coping. It is important to understand the coping mechanisms utilized by residents to help deal with the stress of training, as the use of various coping techniques may affect the development of or recovery from burnout. Further studies are needed to determine which coping mechanisms are associated with lower levels of burnout so that their use can be encouraged in our trainees.

Frequency of Use of Coping Mechanism by Gender

Coping Mechanism	Male Mean (sd)	Female Mean (sd)	p-value
Acceptance	4.65 (1.93)	5.09 (1.70)	0.089
Active Coping	5.20 (1.79)	5.29 (1.75)	0.734
Behavioral Disengagement	2.36 (0.88)	2.43 (0.87)	0.583
Denial	2.15 (0.52)	2.21 (0.71)	0.466
Humor	4.43 (1.78)	3.82 (1.55)	<0.05
Planning	4.96 (1.98)	5.18 (1.70)	0.395
Positive Reframing	4.76 (1.78)	5.19 (1.72)	0.083
Religion	3.39 (1.73)	3.67 (1.74)	0.252
Self blame	3.10 (1.41)	3.59 (1.59)	<0.05
Self Distraction	4.42 (1.56)	4.68 (1.59)	0.240
Substance Abuse	2.17 (0.55)	2.06 (0.32)	0.091
Use of emotional support	5.29 (1.77)	6.06 (1.58)	<0.005
Use of Instrumental Support	4.91 (1.82)	5.53 (1.85)	<0.05
Venting	3.66 (1.39)	3.89 (1.41)	0.253

Frequency can range from 2–8, higher value indicates more frequent use of the mechanism

GENDER DIFFERENCES IN INPATIENT END-OF-LIFE DISCUSSIONS FOR PATIENTS WITH ADVANCED CANCER Rashmi K. Sharma; Sasha Jones; Frank Penedo; Kenzie A. Cameron. Northwestern University, Chicago, IL. (Tracking ID #2198519)

BACKGROUND: Men with advanced cancer are more likely than women to receive aggressive, non-beneficial care at the end of life (EOL). We have previously shown that when EOL discussions occur, they facilitate decreased receipt of aggressive care for men but not for women. However, little is known about how gender may influence the content of EOL discussions. We sought to evaluate gender differences in the content of inpatient EOL discussions for patients with advanced cancer.

METHODS: Via daily contact with oncology, hospitalist, and palliative care services, we identified 40 hospitalized metastatic cancer patients with a known upcoming EOL discussion. As part of a larger study, patients and physicians completed surveys that included assessment of treatment preferences and key topics discussed. We used chi-square tests to evaluate gender differences in topics discussed (yes/no). We calculated both percent agreement and Cohen's kappa to assess physician-patient concordance regarding treatment preferences and topics discussed; percent agreement is reported.

RESULTS: Sixty percent of the 20 male patients were Non-Hispanic White (NHW), 70 % were married, and mean age was 59.6 \pm 15.4 years. Seventy-five percent of the 20 female patients were NHW, 25 % were married, and mean age was 61.4 \pm 8.5 years. All patients had at least a high school education. Thirteen male patients and 16 female patients completed the post-discussion survey. Physicians completed surveys for all 40 discussions. A significant difference was observed in the percentage of male (100 %) and female (75 %) patients reporting discussion of goals of care ($p = 0.03$). For other key topics no significant differences emerged: incurability (54 % men vs. 31 % women reported discussion), treatment options (54 vs. 31 %), prognosis (77 vs. 56 %), resuscitation preferences (46 vs. 69 %), and hospice (62 vs. 81 %). Physicians reported discussing incurability in 80 % of discussions with male patients vs. 85 % for female patients, goals of care (95 % vs. 90 %), treatment options (95 vs. 70 %, $p = 0.04$), prognosis (60 vs. 65 %), resuscitation preferences (30 vs. 60 %, $p = 0.03$) and hospice (65 vs. 85 %). Physician-patient concordance regarding topics of discussion was generally poor. In all but one key topic (resuscitation preferences), agreement between patient and physician that a topic was discussed was higher among male as compared to female patients. Specifically, physician patient-concordance (percent agreement) for male patients regarding incurability was 54 vs. 35 % agreement for female patients; goals of care (92 vs. 77 %), treatment options (77 vs. 59 %), prognosis (65 vs. 65 %), hospice (92 vs. 88 %), and resuscitation preferences (69 vs. 82 %). Regarding EOL treatment preferences, 23 % of male patients reported a preference to focus on extending life, 62 % preferred to focus on comfort, and

15 % were unsure, compared to 13 % of female patients who preferred to extend life, 81 % who preferred comfort, and 6 % unsure. Physician-patient concordance regarding treatment preferences was especially poor for female patients (kappa -0.01 vs. 0.45 for male patients); physicians overestimated the percentage of patients preferring care focused on extending life for 15 % of male and 25 % of female patients.

CONCLUSIONS: We found gender differences in the content of EOL discussions. We also found poor physician-patient agreement regarding treatment preferences and discussion of incurability for male and female patients. While our findings are limited by a small sample size, they suggest that additional research is needed to explore how gender differences in EOL communication may account for observed differences in receipt of care at the EOL.

HEALTH DISPARITIES IN THE TREATMENT OF POOR PROGNOSIS CANCER: AGE AND RACE IN THE RECEIPT OF CANCER DIRECTED SURGERY

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BACKGROUND: Poor prognosis cancers such as pancreatic and lung cancer disproportionately affect blacks. The incidence is higher and survival poorer for these cancers in black patients when compared to white patients. Despite a higher incidence, black patients are less likely to undergo cancer directed surgery for these cancers when compared to white patients. Factors underlying these disparities are likely multidimensional, but some research indicates that blacks are offered resection at similar rates as white patients. Our aim was to explore the possible role of age on this racial disparity in the surgical treatment of pancreatic and lung cancer utilizing the Nationwide Inpatient Sample (NIS), a national database of discharge data from a sample of all US nonfederal hospitals.

METHODS: Utilizing NIS data from 2007 to 2009, all adult patients undergoing pancreatic resection for pancreatic cancer were identified via a primary procedure code for Whipple surgery (ICD9=52.7). Patients with a primary diagnosis of acute or chronic pancreatitis were excluded. All adult patients undergoing lung resection were identified via a primary procedure code for pneumonectomy or lobectomy as defined by the Agency for Healthcare Research and Quality (AHRQ)'s Clinical Classification Software for pneumonectomy or lobectomy. For the respective cancer, our outcome variable was patient age. Our independent variable was race/ethnicity. Our covariates were sex, Charlson Comorbidity Index (CCI), insurance status, and income (quartile at the zipcode level). Univariate analyses utilized the Student T test and Chi square test. Multivariable analyses utilized general linear models. All analyses were carried out in SAS (version 9.3).

RESULTS: Of all patients undergoing pancreatic and lung resection respectively, 76.1 and 82.5 % were white and 7.3 and 7.6 % were black. In univariate analysis, race/ethnicity was significantly associated with age for both pancreatic and lung resection patients ($p < .001$). In younger patients (age <65) within each race/ethnicity category, the proportion undergoing resection for these cancers was higher in blacks when compared to whites. In contrast, in the very old (age >80) the proportion undergoing resection for these cancers was much higher in white patients (i.e. of all white patients undergoing pancreatic resection 10.3 % were over 80 whereas only 3.4 % of black patients were over 80). Multivariable adjustment for sex, CCI, insurance status, and income did not significantly alter these findings.

CONCLUSIONS: Consistent with prior data, our study found that black patients receiving cancer directed surgery for poor prognosis cancers were underrepresented when compared to their overall proportion of the US population (12.6 %). Additionally, receipt of these surgeries was highly associated with age—very old minority patients were much less likely to undergo surgery than younger minority patients even after adjustment for comorbidity and SES. When counseling patients diagnosed with poor prognosis cancers, clinicians should be aware of the particularly low prevalence of receipt of possibly life prolonging cancer directed surgery in the very old, minority patient. Additionally, system interventions intended to address this health disparity should consider an age-specific design that targets older minority patients.

RESULTS:
All Patients Undergoing Whipple For Cancer Treatment 2007-2009

		AGE CATEGORY			
RACE Frequency (Row %)		Under 65	65 - 79	80 or Greater	Row Total (%)
	White	1289 (42.33)	1441 (47.32)	315 (10.34)	3045 (76.13)
	Black	180 (61.22)	104 (35.37)	10 (3.4)	294 (7.35)
	Hispanic	203 (55.77)	146 (40.11)	15 (4.12)	364 (9.1)
	Asian	69 (44.52)	70 (45.16)	16 (10.32)	155 (3.88)
	Native American	16 (55.17)	9 (31.03)	4 (13.79)	29 (7.3)
	Other	55 (48.67)	49 (43.36)	9 (7.96)	113 (2.83)
	Column Total (%)	1812 (45.3)	1819 (45.5)	369 (9.2)	4000 (100)
	Frequency Missing = 873				

$p < 0.001$

All Patients Undergoing Pneumonectomy/lobectomy 2007-2009

		AGE CATEGORY			
		Under 65	65 - 79	80 or Greater	Row Total (%)
RACE Frequency (Row%)	White	14354 (44.86)	14715 (45.99)	2929 (9.15)	31998 (82.5)
	Black	1913 (64.74)	933 (31.57)	109 (3.69)	2955 (7.62)
	Hispanic	1021 (57.81)	632 (35.79)	113 (6.4)	1766 (4.55)
	Asian	577 (55.64)	390 (37.61)	70 (6.75)	1037 (2.67)
	Native American	110 (56.99)	70 (36.27)	13 (6.74)	193 (0.5)
	Other	470 (56.09)	319 (38.07)	49 (5.85)	838 (2.16)
	Column Total (%)	18445 (47.55)	17059 (43.98)	3283 (8.46)	38787 (100)
	Frequency Missing = 9771				

$p < 0.001$

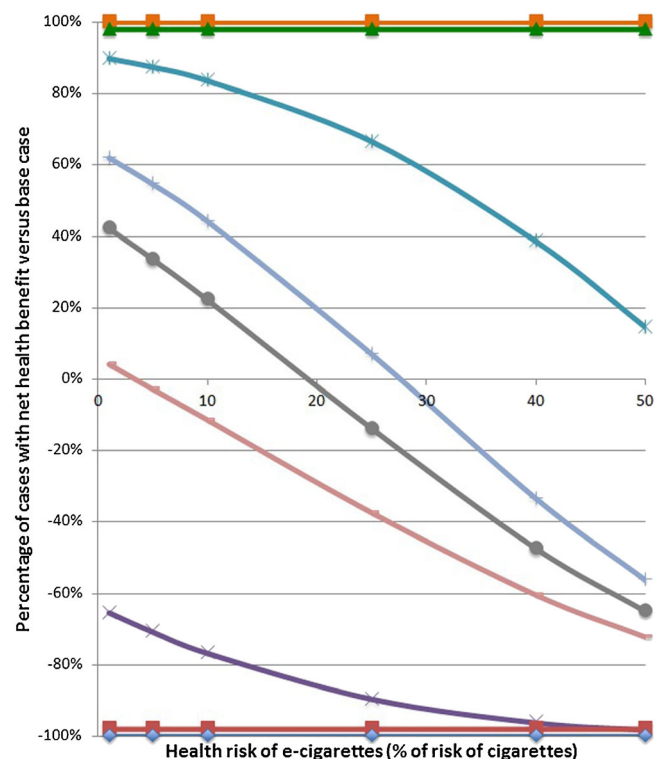
HEALTH IMPACT OF ALTERNATIVE SCENARIOS OF EXPANDING ELECTRONIC CIGARETTE SALES: A MONTE CARLO ANALYSIS Sara Kalkhoran; Stanton A. Glantz. University of California, San Francisco, San Francisco, CA. (*Tracking ID #2194974*)

BACKGROUND: The prevalence of electronic cigarette (e-cigarette) use is increasing. Population health impacts will depend on effects on cigarette smoking behaviors, levels of dual use with conventional cigarettes, and product toxicity. We evaluated the potential health effects of various scenarios of increasing promotion and use of e-cigarettes in the United States.

METHODS: A Monte Carlo simulation was developed from an initial state of no cigarette or e-cigarette use to one of five final states: never use of cigarettes or e-cigarettes, cigarette use, e-cigarette use, dual use of cigarettes and e-cigarettes, or quit. A base case (simulating the status quo) and nine different scenarios were analyzed. Health "costs" were assigned to each final state on a unitless scale from 0 to 100, with 0 for never smoking cigarettes and 100 for continued smoking. Scenarios were analyzed assuming e-cigarette health costs from 1 to 50 % of the health cost of cigarettes.

RESULTS: Compared to the base case, a harm reduction scenario where more smokers are interested in quitting and more use e-cigarettes for quit attempts instead of unassisted attempts, or one where e-cigarettes are taken up only by youth who would have smoked cigarettes, had population-level health benefit regardless of e-cigarette health cost. Conversely, in scenarios where either e-cigarette promotion leads to renormalization of cigarette smoking or e-cigarettes are used primarily by youth who never would have smoked, there is net health harm across all e-cigarette health costs. In other scenarios, the net health effect varies based on what the health cost of e-cigarettes will turn out to be, with most showing net harm if e-cigarettes are 5–30 % as harmful as cigarettes (Figure).

CONCLUSIONS: Population health effects of widespread promotion and distribution of e-cigarettes will greatly depend on how harmful e-cigarettes turn out to be. Projections based on current youth uptake and use patterns in smokers suggest net health harms are likely in many scenarios.



Probability of each scenario having net health benefit versus the base case as a function of e-cigarette health cost. The top two scenarios always have population health benefit and the bottom two scenarios always have population health deficit (lines slightly shifted for display, are actually 100 %). The lines correspond to the following scenarios (from top to bottom): (1) 10 % absolute increase in e-cigarette use from cigarette initiators, (2) harm reduction, (3) decreased quit intentions with more e-cigarette use for cessation from those not attempting to quit, (4) aggressive promotion, (5) fivefold increase in e-cigarette initiation, (6) e-cigarette as nicotine replacement therapy substitute, (7) decreased quit intentions with more e-cigarette use for cessation, (8) renormalization of smoking, and (9) 10 % absolute increase in e-cigarette use from never users

HEALTH LITERACY LIMITATIONS IN ACCESSING & USING A PATIENT PORTAL: IMPLICATIONS FOR DISPARITIES IN CARE

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BACKGROUND: Internet patient portals satisfy meaningful use requirements by exposing personal health information (PHI) in a secure manner to patients and caregiver delegates. Most portals also allow patients or delegates to securely message healthcare providers to ask clinical questions and receive responses, thus, obtaining care outside face-to-face clinic visits. Therefore, not using these systems may create disparities in access to care, and might ultimately contribute to disparities in health. We examined the relationship between patient characteristics, including sociodemographics, and patients' health literacy and numeracy skills with access and usage of an online patient portal.

METHODS: Patients hospitalized with acute cardiovascular conditions at Vanderbilt University Medical Center or Williamson Medical Center in Tennessee were enrolled in the Vanderbilt Inpatient Cohort Study (VICS). Using baseline data, we performed a cross-sectional analysis to determine the patient characteristics associated with having a patient portal account, how often the account was used for messaging providers, and how often the account was used to access PHI. For each of these outcome variables, we examined bivariate relationships (using chi-square, Kruskal-Wallis, and Wilcoxon tests). We also ran a multivariable logistic regression model for the binary outcome (having a portal account or not) and proportional odds regression models for ordinal outcomes (how often the portal was used for messaging and for accessing PHI). Models controlled for age, gender, minority status, education, income, insurance status, health literacy assessed with the Brief Health Literacy Screen (BHLS) and the Short Test of Functional Health Literacy in Adults (sTOFHLA), and numeracy assessed with the Subjective Numeracy Scale.

RESULTS: The average age of all patients ($n=860$) was 61 years; 55.5 % of patients were male; and 18.2 % were minorities. The average education was 13 years and average sTOFHLA score was 33 (out of 36). Of the 860 patients who had heard of the institution's patient portal, 510 patients had an account (59.3 %). We found that having a patient account was associated with minority status, insurance status, age, education, income, subjective numeracy, brief health literacy screen score, and sTOFHLA score ($p<0.05$ for each comparison). These same variables were significantly associated with how often patients used the patient portal for messaging providers and accessing PHI. In adjusted analyses, the odds of having a patient portal account were 63 % lower for patients with Private-Pay/No-insurance when compared to patients with commercial insurance ($p=0.005$); and were lower for patients with lower income ($p=0.001$). Additionally, use of the portal to message providers increased by 29 % per 4 point increase in health literacy as assessed by the BHLS ($p=0.046$), and was also significantly associated with more education, higher income, and higher sTOFHLA score ($p=0.024$, $p<0.001$, $p=0.030$). For patients with Private-Pay/No-insurance, Other, and TNCare/Medicaid the odds of using the portal for messaging decreased by 65 % ($p=0.005$), 68 % ($p=0.023$) and 61 % ($p=0.044$) respectively when compared to patients with commercial insurance. Use of the portal to access PHI decreased by 63 % for patients with Private-Pay/No-insurance when compared to patients with commercial insurance ($p=0.008$), and was increased among patients with higher income ($p=0.049$).

CONCLUSIONS: As usage of patient portals and secure messaging increases, health literacy disparities in usage are likely, potentially creating disparities in access to healthcare and health outcomes.

HEALTH-SPECIFIC INFORMATION AND COMMUNICATION TECHNOLOGY USE AND ITS RELATIONSHIP TO CHRONIC DISEASE STATUS IN COMMUNITIES ON THE SOUTH SIDE OF CHICAGO

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BACKGROUND: Preventable chronic diseases are a leading driver of rising US health care costs. Many patient-facing information and communication technologies (ICT) aim to aid in the prevention and management of these costly conditions. These technologies include mobile apps for disease monitoring and management, text messages for appointment and self-care reminders and web-based information and decision support tools. While efficacy studies have demonstrated a variety of improved clinical outcomes with ICT-based interventions, the ability of health-specific ICT resources to more broadly impact health outcomes will depend on accessibility and use in populations with high rates of these health conditions. The South Side Health and Vitality Studies, a collaboration between University of Chicago researchers and community residents, seeks to identify mechanisms through which ICT can be used by people living in high poverty communities to enhance wellness, self-care and disease management. We first describe patterns of ICT use on Chicago's South Side and compare them to national estimates. We then examine the relationship between common chronic conditions, specifically obesity, hypertension, and diabetes and health-specific ICT use.

METHODS: A population-based biosocial survey was conducted between November 2012 and July 2013 with a probability sample of 267 adults ages 35 years and older randomly selected from households on Chicago's South Side. After applying appropriate survey weights, descriptive statistics were used to examine the prevalence of general ICT use (texting, emailing, going online or app use), as well as health-specific ICT use (looking up health information, health-related app use, purchasing medications, communicating with providers, participating in online health support groups and managing records or benefits). These estimates were then compared to national-level estimates of these ICT activities from the 2012 PewResearch Internet Project. Chi-square tests were used to examine the relationship between sociodemographic characteristics and chronic disease status, specifically obesity (measured BMI ≥ 30 kg/m²), hypertension (self-reported or SBP ≥ 140 or DBP ≥ 90), and diabetes (self-reported or hemoglobin A1c ≥ 6.5 %) and the likelihood of health-specific ICT use. Multivariable logistic regression, adjusting for age and insurance type, was used to describe the relationship between chronic disease status and the odds of health-specific ICT use.

RESULTS: The weighted survey response rate for this probability sample was 62 %. In this sample, 24 % were unemployed or unable to work, 25 % were uninsured, and 36 % reported an annual household income less than \$25,000. General (75 %) and health-specific (52 %) ICT use were prevalent and more common among younger, more educated, and insured individuals. No differences in health-specific use were noted by race or ethnicity. Rates of all ICT activities were similar when comparing the South Side population with national estimates. The prevalence of chronic conditions among the South Side population was high: hypertension (63 % overall, 49 % diagnosed and 14 % undiagnosed), obesity (53 % overall, 37 % diagnosed and 16 % undiagnosed) and diabetes (25 % overall, 18 % diagnosed and 7 % undiagnosed). Among individuals with at least one chronic disease (76 %), the highest prevalence of health-specific ICT use was among people with diagnosed obesity (67 %) and the lowest prevalence of use was among people with diagnosed hypertension (39 %). In bivariate analysis, there was a statistically significant difference in health-specific ICT use by obesity status, with those of normal weight (29 %) having a lower prevalence of use than overweight (48 %), undiagnosed obese (50 %) and diagnosed obese individuals (66 %, $p<0.01$). Also, those with diagnosed hypertension had a significantly lower prevalence of use (39 %) than those who were normotensive (68 %, $p=0.01$). After controlling for age and insurance type, diagnosed obesity (AOR=4.2 [95 % CI:1.5-11.5]) and undiagnosed diabetes (AOR=4.2 [95 % CI:1.1-15.5]) were associated with increased odds of health-specific ICT use when compared to those without these conditions.

CONCLUSIONS: The burden of chronic and undiagnosed disease was very high in this urban population; only 24 % had none of the examined chronic conditions. Health-specific ICT use was also prevalent but varied by socioeconomic characteristics and disease status. The study findings suggest that obesity may be an especially ideal target for health-specific ICT-based interventions in this population. The high prevalence of obesity among residents on Chicago's South Side and in other high poverty, minority communities, along with the finding of increased odds of health-specific use ICT in this group reveals an already online population with high health needs and risks. This is a group that could be significantly impacted by thoughtfully designed and effectively implemented ICT-based health interventions and resources.

HEALTHY LIVING PARTNERSHIPS TO PREVENT DIABETES (HELP PD): A RANDOMIZED CONTROLLED TRIAL TO PREVENT DIABETES THROUGH DIET AND EXERCISE: 2 YEAR EFFECTS ON THE METABOLIC SYNDROME Carolyn F. Pedley²; Caroline Blackwell³; Doug Case²; Jeffrey A. Katula^{3, 4}; Mara Z. Vitolins¹; David C. Goff⁶. ¹Wake Forest School of Medicine, Winston Salem, NC; ²Wake Forest Medical Center, Winston-Salem, NC; ³Wake Forest School of Medicine, Winston-Salem, NC; ⁴Wake Forest, Winston-Salem, NC; ⁵University of Colorado, Denver, CO. (Tracking ID #2196912)

BACKGROUND: The metabolic syndrome is a constellation of clinical features which in combination identifies individuals who are at increased risk of developing diabetes and cardiovascular disease including stroke. Cardiovascular events remain the leading cause of death in the United States and interventions to reduce risks are an important function of internal medicine practices. The Healthy Living Partnerships to Prevent Diabetes (HELP PD) lifestyle intervention was designed to promote modest weight loss (5–7 %) and was conducted as a single center RCT to prevent the development of diabetes in high risk individuals. The effects on the metabolic syndrome in participants were analyzed at 12 and 24 months.

METHODS: Single center RCT was conducted via a local diabetes education center which oversaw the conduct of the lifestyle intervention. Overweight and obese participants (BMI 25–39.9) with elevated fasting glucose (95–125 mg/dl) were randomly assigned to either a group-based lifestyle weight loss (LWL) intervention or enhanced usual care (EUC). Three hundred one individuals were enrolled in the trial and data was collected during 2007–2011. LWL groups of 8–12 met in community settings weekly for 6 months with the sessions conducted by trained community health workers (CHWs). These sessions focused on creating negative energy balance by negative calorie balance and increased physical activity and was modeled after the interventions of DPP. During months 7–24 the focus shifted to weight maintenance. EUC participants met with a dietician for 2 individual sessions and then received monthly mailings of a newsletter. Outcomes were assessed every 6 months and included fasting glucose, waist circumference, triglycerides, blood pressure, LDL and HDL cholesterol. Participants were assessed for the presence of the metabolic syndrome which as proposed by the Adult Treatment Panel III (ATP III) and revised by the National Cholesterol Education Program (NCEP) is defined by the combination of any 3 of the following 5 traits: (1) waist circumference ≥ 40 in. for males and ≥ 35 in. for females, (2) fasting triglycerides ≥ 150 mg/dl or drug treatment for triglycerides, (3) HDL cholesterol male < 40 mg/dl and female < 50 mg/dl or drug treatment for low HDL, (4) blood pressure ≥ 130 mm Hg systolic or ≥ 85 mm Hg diastolic or drug treatment for elevated blood pressure and (5) fasting glucose (FPG) ≥ 100 mg/dl or drug treatment to lower blood glucose. Chi-square and Wilcoxon rank-sum tests were used to assess baseline differences between the intervention and control groups in categorical and continuous variables, respectively. Repeated measures analysis of variance, constrained to have equal means at baseline was used to assess the effect of the HELP PD intervention on the parameters of the metabolic syndrome. An unstructured covariance matrix was used to model the within patient correlations over time. Linear contrasts were used to assess the intervention effect at each time as well as the average post-randomization effect. SAS v9.3 was used to perform the analyses.

RESULTS: At baseline there were no significant differences in the presence of the metabolic syndrome between the LWL group 108/151 (72 %) vs 104/150 (69 %) in the EUC group. At 6, 12 and 24 months there were significant reductions in waist circumference and fasting glucose in the LWL compared to the EUC participants. Systolic blood pressure was significantly less at 6 months (120.5 vs 124.9 but not at 12, 18 and 24 months. Diastolic blood pressure differences were significant at 6 and 24 months favoring LWL. HDL cholesterol was significantly greater in the LWL compared to EUC at 12 and 24 months. Fasting triglycerides were significantly less at 12 months in LWL but not at 24 months. At 12 months there were significantly fewer with the metabolic syndrome in the LWL 71/135 (53 %) vs EUC 95/138 (69 %). The pattern persisted at 24 months with 77/127 (61 %) having the metabolic syndrome in the LWL compared to 103/134 (77 %) in the control group.

CONCLUSIONS: The HELP PD lifestyle intervention was successful in achieving modest weight loss comparable to the DPP trial. This population of overweight/ obese individuals with elevated fasting glucose 95–125 mg/dl had a high prevalence of the metabolic syndrome (72 % LWL) and (69 % EUC). The benefits of the program in reducing the metabolic syndrome in the LWL intervention group were highly significant and these benefits were still present at 24 months. Such interventions could be incorporated into internal medicine practices as a powerful tool in preventing cardiovascular disease in high risk individuals.

HELPING WOMEN UNDERSTAND THEIR BREAST DENSITY RESULTS THROUGH A PATIENT-CENTERED VIDEO Erin N. Marcus^{3, 2}; Monica M. Yepes^{1, 2}; Noella Dietz^{4, 2}; Debra Annane². ¹University of Miami Miller School of Medicine, Miami, FL; ²Sylvester Comprehensive Cancer Center, Miami, FL; ³University of Miami Miller School of Medicine, Miami, FL; ⁴University of Miami Miller School of Medicine, Miami, DC. (Tracking ID #2198096)

BACKGROUND: Breast density decreases the sensitivity of screening mammography. At the behest of patient advocates, several states have passed legislation requiring breast imaging centers to inform women in writing of their density results, so that women with elevated breast density can consider supplemental screening with ultrasound or newer imaging modalities such as breast tomosynthesis. It is unclear how to communicate this information in a way that minimizes patients' anxiety and improves their understanding.

METHODS: We conducted five focus groups in English and Spanish with 25 women who had been diagnosed with dense breasts. Qualitative analyses were done to capture women's understanding of dense breasts and how they thought density information should be explained. Based on the focus group data, investigators created scripts for two seven minute videos in English and Spanish. The first half of the videos consist of a breast imaging physician explaining density, ultrasound, and tomosynthesis and the likelihood of false positive results. The second half of the videos consist of on-camera interviews with women who have dense breasts.

RESULTS: The investigators conducted six interviews with focus group participants. Two of the women had also undergone tomosynthesis; all had undergone ultrasound in addition to mammography screening. Recurring themes included the women's fears about their prognosis when told they had dense breasts, the lessening of their anxiety after they understood the meaning of density, and their recommendation for other women to be proactive and ask their doctor for more information. The videos are being edited and will be shown to all focus group participants to assess acceptability when completed.

CONCLUSIONS: Video is a useful tool to communicate breast density information and provide patient-centered information about tomosynthesis and other breast imaging techniques. Once completed, the video we developed will be available for dissemination in breast center waiting rooms. Future investigations should assess the effectiveness of this method in improving patient understanding of breast density and breast imaging generally.

HIGH PERCEIVED SOCIAL SUPPORT PROTECTS AGAINST 30 DAY HOSPITAL READMISSION IN A MULTI-ETHNIC, LIMITED ENGLISH PROFICIENCY, SAFETY-NET POPULATION Brian Chan; Lauren Goldman; Urmimala Sarkar; David Guzman; Edgar Pierluissi; Michelle Schneidermann; Jeff Critchfield; Margot Kuschel. San Francisco General Hospital, University of California, San Francisco, San Francisco, CA. (Tracking ID #2195414)

BACKGROUND: The Center for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program focused attention to preventing 30-day hospital readmissions. Readmission prevention programs in safety-net hospitals have met with mixed success, increasing concern for the financial risks readmission policies have on these institutions and the populations served. Low social support is thought to be associated with poor health outcomes; however, little is known regarding the relationship between social support and hospital readmission. We examine the role of a multidimensional measure of perceived social support in 30 day readmission rates in a cohort of older adults admitted to a safety-net hospital.

METHODS: Over the course of 2 years (2010–2012), we enrolled community-dwelling English, Spanish and Chinese speaking older adults (55 years and older) admitted to non-surgical and non-psychiatric services at a University-affiliated urban safety-net hospital in San Francisco, California. We assessed social support during the baseline interview using the Multidimensional Scale of Perceived Social Support (MSPSS), a 12 item instrument that measures perception of support relationships from spouse, family, and friends. We defined high levels of social support as the highest quartile of MSPSS in the population. We ascertained 30 day readmission and mortality based upon a combination of participant self-report by telephone interview, hospital record, and death record review. We used multivariate logistic regression to adjust for patient demographics, health status, and health behaviors.

RESULTS: The study population ($n=700$) had mean age of 66.2 (SD 9.0), with 19.0 % White, 24.5 % Black, 31.6 % Asian, and 19.6 % Latino. Over half the patient population had cognitive impairment assessed by Telephone Interview for Cognitive Status (TICS score < 20) (54.2 %), and 28.1 % were noted to have a deficit in Activities of Daily Living (ADL). The overall 30 day hospital readmission rate was 14.0 %; 5 participants died prior to 30 day follow up (0.7 %). Amongst the 152 participants in the highest quartile of perceived social support, 13 experienced readmission and none died within 30 days

(8.6 %). Those with high levels of perceived social support were 2 times less likely to experience readmission or death than those with lower levels (OR=0.47, 95 % CI .26, .99). When adjusted for age, sex, race, cognitive impairment, Charlson score, prior hospitalization, substance abuse, and ADL disability, the relationship of high social support to readmission or death was attenuated but persisted (AOR=0.56, 95 % CI .29, 1.1).

CONCLUSIONS: In a cohort of hospitalized older, low-income, multi-lingual, cognitively impaired population with high medical comorbidities nearing discharge, those with high levels of perceived social support were less likely to experience 30 day readmission or mortality. Accounting for individuals' perceived social support on admission may aid targeting of transitional care resources to improve outcomes. These findings suggest interventions that provide a social support component merit increased attention.

HIGH QUALITY TRANSITIONS OF CARE REDUCE HOSPITAL READMISSIONS AMONG PATIENTS WITH PCI AND CABG

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BACKGROUND: Under the Partnership for Patients Program, the Centers for Medicare & Medicaid have invested \$300 million in programs to improve transitions of care (TOC) from hospital to home with the goal of decreasing unnecessary hospital readmissions. However, the relationship between transitions of care and hospital readmissions remains unclear. In 2013, a new TOC quality metric, the Care Transitions Measure (CTM[®]-3) was incorporated into the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. High scores on the CTM[®]-3 have been associated with fewer readmissions in small populations ($n=200-300$). However, this association has not been tested in larger, more diverse populations. Given the recent policy initiatives focused on TOC and readmissions, it is important to clarify the relationship between the two. The primary objective of this study was to determine whether CTM[®]-3 scores were independently associated with readmissions within a larger more representative cohort of patients that it has previously been tested.

METHODS: Analysis of data from a longitudinal, single center study of patients who received percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) at Christiana Care Health System from 2013 to 2014. CTM[®]-3 scores were collected by trained research staff blinded to study hypothesis, by telephone, within 30 days of discharge. Three ANOVA analyses were performed for those with PCI, CABG, and the combined group to determine the relationship between mean CTM[®]-3 scores and covariates associated with readmission (race, gender, age, insurance status, comorbidity count, and prior hospital use). Logistic regression for the combined group examined whether CTM[®]-3 scores independently predicted 30 day non-elective readmission.

RESULTS: Of 2963 total patients, 1594 (54 %) completed CTM[®]-3 surveys. Within this group, 197 (12 %) were African American, 136 (9 %) had Medicaid, 816 (51 %) had Medicare, 1434 (90 %) were over the age of 50 and 920 (58 %) had greater than 3 comorbidities. Within the PCI, CABG, and combined groups, higher mean CTM[®]-3 scores were associated with fewer comorbidities (PCI: mean 82.5, vs 75.8 $p<0.001$; CABG: mean 83.3 vs 79.1 $p<0.045$; combined: mean 82.6 vs 77.0 $p<0.001$). Within PCI and combined groups, higher mean CTM[®]-3 scores were associated with lower prior hospital use (PCI: mean 81.9 vs 75.6, $p<0.001$; combined: mean 82.1 vs. 77.2 $p<0.001$) and lower rates of readmission (PCI: mean 80.9 vs 73, $p<0.001$; combined: mean 81.06 vs 74.58, $p<0.001$). On logistic regression, higher CTM[®]-3 scores were associated with lower risk of readmission (adjusted odds ratio 0.99, 95 % Confidence Interval 0.97–0.99, $p=0.004$). Every 10-point increase in CTM[®]-3 decreased risk of readmission by 14 %.

CONCLUSIONS: This is the largest study to date to examine the relationship between CTM[®]-3 scores and readmissions, and we found that the relationship was significant, but modest. We also found that CTM[®]-3 scores were associated with immutable clinical factors related to readmissions such as number of comorbidities and prior hospital utilization, which could impact the ability to improve CTM[®]-3 scores through TOC interventions. A considerable public investment has been made based on the association between high quality TOC and readmissions. It is important for policy makers and health systems to understand that this relationship remains tenuous and that the new HCAHPS metric for TOC, the CTM[®]-3 may be difficult to improve.

HIGH-COST PATIENTS: “HOT-SPOTTERS” DON’T EXPLAIN THE HALF OF

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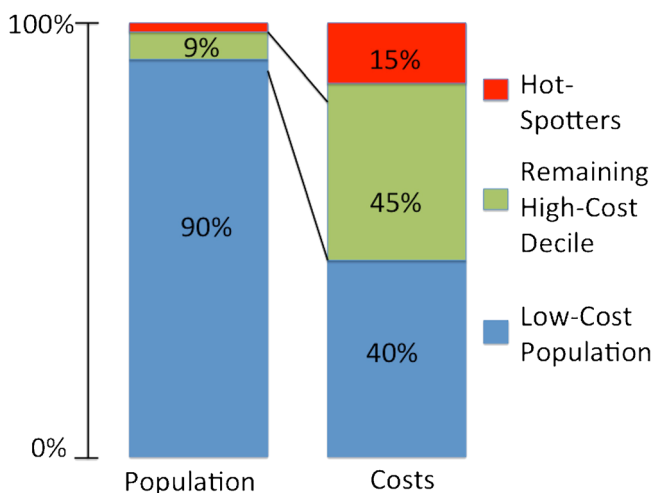
BACKGROUND: Healthcare costs in the US are concentrated among a small fraction of the population, but knowledge regarding the characteristics of high-cost patients is limited.

Patients with frequent admission to the hospital or ED, aka “hot-spotters,” have received special media attention in recent years, but efforts to curb costs through enhanced coordination of outpatient care have not yielded cost savings. To better understand the patterns of high cost care, we examined the differences in inpatient and outpatient utilization, as well as the distribution of high-cost conditions, among sub-groups of high-cost patients over a single year.

METHODS: We performed a retrospective cross-sectional chart review of high-cost patients in one health system. Using the Quality Resource and Use Report distributed by the Centers for Medicare and Medicaid Services, we identified Medicare patients who were hospitalized exclusively at Cleveland Clinic Health System (CCHS) hospitals and received at least 90 % of their primary care services at a CCHS facility in 2012. Using data from CCHS internal cost accounting systems, we summed all direct and indirect costs associated with receiving care at a CCHS facility to estimate total costs per patient. We defined the high cost population as the 10 % of patients with the highest expenditures. This high-cost population was divided into four roughly even quartiles, from most expensive to least (i.e. the top 1–2.5, 2.5–5, 5–7.5, and 7.5–10 percentiles of the population). Total number of admissions, inpatient days, ICU days, ED visits, and outpatient visits were obtained from the electronic medical record. Hot-spotters were defined as those in the ≥95th percentile for number of hospital and/or ED admissions. We used the Agency for Healthcare Research and Quality Clinical Conditions Software to group primary and secondary ICD-9 diagnosis and procedure codes. High-cost conditions and procedures were identified through a literature search and clinical judgment. We used the non-parametric Kruskal-Wallis test to identify differences in means and a Chi-squared test or Fisher's exact test for differences in proportions among the high-cost quartiles.

RESULTS: The sample included 14,855 patients. High-cost patients (10 % of patients, $n=1486$) accounted for 60 %, the top two high-cost quartiles (5 %) accounted for 45 %, and the top 1 % of patients accounted for nearly 20 % of the entire population's costs. High-cost patients incurred almost 90 % of all inpatient costs. Mean utilization of services increased with quartile for all services, except primary care visits. However, there was a wide range of utilization patterns. Overall, one-third of high-cost patients had no admissions and few had more than 2, but in each quartile, some patients were not admitted. A similar trend was observed for inpatient days, ICU days, and ED visits. Even the top 1 % had varied utilization patterns. Hot-spotters had ≥4 admissions or ≥4 ED visits. They accounted for 11.5 % of high-cost patients ($n=171$) and 25.1 % of their costs (Figure). Most hot-spotters clustered in the top quartile ($n=115$, 67.3 %), but they represented just 7.7 % of that group. They accounted for a third (34.2 %) of the most expensive 1 % of patients. The distribution of high-cost conditions varied across quartiles. For example, chemotherapy was most common in the top quartile (32.1 % vs. 11.1 %, 5.6 %, and 1.9 % in the 2nd-4th quartiles, respectively, $p<0.001$). Osteoarthritis was most common in the third quartile. Diabetes and cardiac arrhythmia and arrest were present in >20 % of patients and evenly distributed across quartiles. High-cost procedures that concentrated in the top two quartiles included heart valve surgery (100 %), spinal fusion (100 %), and transplant surgery (100 %).

CONCLUSIONS: Patterns of resource utilization vary among high cost patients, with hot-spotters representing just a small minority of that population. Therefore, programs that focus solely on preventing admissions through care coordination are unlikely to have a large impact on overall cost.



Proportion of hot-spotters among the high-cost population and their attributable costs.

HIGH-RISK HOSPITALIZED PATIENTS HAVE LOW PERCEIVED SUSCEPTIBILITY TO CHRONIC KIDNEY DISEASE Milda R. Saunders²; Sharon D. Kim¹; David Meltzer¹; Marshall Chin¹. ¹University of Chicago, Chicago, IL; ²University of Chicago Medical Center, Chicago, IL. (Tracking ID #219733)

BACKGROUND: Over 14 % of the US population has chronic kidney disease (CKD), a disease associated with high morbidity and mortality. However, the development and progression of CKD can be delayed with aggressive risk factor control of diabetes and hypertension, the two most common risk factors for CKD. We sought to assess perceived susceptibility to CKD and to identify factors associated with perceived risk of CKD in our cohort of high risk, hospitalized patients.

METHODS: Between July and September 2014, we surveyed 717 general medicine inpatients about their perceived risk for kidney disease. As part of at the University of Chicago Hospitalist Project, a large-scale ongoing study of hospitalized patients and patient outcomes, patients completed an inpatient interview on their demographic characteristics, health status, and recent health care use. During the interview, we asked patients use a 5 point scale to report how likely they were "to develop weak or failing kidneys or chronic kidney disease in the next 10 years." We compared demographic, clinical, and health service use variables by patient report of CKD susceptibility using a chi-square test for the categorical variables and a one-way ANOVA test for the continuous variables. We used logistic regression to analyze the influence of the demographic, clinical, and health care utilization covariates on the likelihood of a patient reporting risk for CKD.

RESULTS: In this sample of urban, hospitalized patients, perceived risk for CKD was low; only 27 % of patients considered themselves likely (very likely or moderately likely) to develop CKD. The majority of patients were African American (68 %), women (55 %) with a median age of 54. Patients also had a high prevalence of self-reported CKD (19 %) or CKD risk factors included diabetes (25.6 %) and hypertension (55.4 %). In bivariable analysis, factors associated with high perceived risk of CKD include having diabetes (OR 1.7), hypertension (OR 2.1), cardiovascular disease (OR 1.8), and 4 or more doctor visits per year (OR 2.8, compared to 1 or less, all $p < 0.05$). Patients that wanted their physician to present them with choices and ask their opinions were less likely to perceive themselves at risk for CKD (OR 0.35, 95 % CI 0.03, 0.91). These factors did not remain significant in multi-variable analysis.

CONCLUSIONS: In hospitalized patients at high risk for CKD, perception of CKD risk remained low. Hospitalization provides an opportunity to identify existing CKD risk factors in order to educate patients and link them to multi-disciplinary outpatient care.

HIGHER INPATIENT ACUTE MYOCARDIAL INFARCTION MORTALITY AMONG ASIAN AMERICANS Eun Ji Kim²; Nancy R. Kressin⁴; Michael K. Pasche-Orlow³; Jennifer E. Rosen²; Meng-Yun Lin¹; Amresh D. Hanchate³. ¹Boston Medical Center, Boston, MA; ²Boston University, Cambridge, MA; ³Boston University School of Medicine, Boston, MA; ⁴Dept of Veterans Affairs and Boston University, West Roxbury, MA; ⁵Medstar Health Research Institute, Hyattsville, MD. (Tracking ID #2198396)

BACKGROUND: There are approximately 1.5 million patients who sustain acute myocardial infarction (AMI) annually in the US and about 5 % of the patients die during their inpatient stay. Asians (including Pacific Islanders) make up 5 % of the US population and are known to have the relatively low risk factors for coronary artery disease compared to other racial/ethnic groups. To date, there is no population-level study that examines racial differences among Asians in inpatient AMI outcomes.

METHODS: We obtained 2010 state inpatient discharge data from 15 states - Arizona, California, Colorado, Florida, Massachusetts, Maryland, Nevada, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Texas, Virginia and Washington - with near-complete reporting of race/ethnicity and high proportions of racial/ethnic minorities. Using the Agency for Healthcare Research and Quality (AHRQ) Inpatient Quality Indicators (IQI) protocol, we identified AMI admissions among adults aged 18 and older. The main outcome was inpatient mortality. Using hierarchical logistic regression models, we estimated differences in inpatient mortality among minorities (Asians, Hispanics, non-Hispanic blacks, and others), relative to non-Hispanic whites, after adjusting for compositional differences in demographics, co-morbidities (Elixhauser categories), area-level differences in indicators of socioeconomic status (SES) (income and poverty) insurance status, rural location, availability of cardiologists, and clustering of patients within hospitals. Similar comparisons were made for ST segment elevation MI (STEMI) and non-STEMI AMIs. Finally, using census county-level data, we compared inpatient AMI mortality rate differences by ethnicity (Indian, Filipino, Vietnamese, Korean, Japanese, and others) treating Chinese as the reference group.

RESULTS: The selected 15 states contained over 75 % of the national Asian population. We identified a total of 444,431 AMIs across race/ethnicity: Asians (2.8 %), Hispanics (11.9 %), non-Hispanic blacks (9.2 %), non-Hispanic whites (70.2 %), others (3.3 %) and missing (2.6 %). Observed inpatient mortality rate was higher among Asians (7.8 %) compared to whites (6.5 %), blacks (5.5 %) and Hispanics (6.2 %) (all p values < 0.05). We examined non-ST segment elevation MI (NSTEMI) and ST segment elevation MI (STEMI) separately and found that inpatient mortality for Asians was the highest for both types (NSTEMI mortality: 5.8 % (Asian), 5.0 % (White), 4.1 % (Black), 4.8 % (Hispanic) and STEMI mortality: 11.0 % (Asian), 9.6 % (White), 9.8 % (Black), 9.0 % (Hispanic)). After adjusting for sex, age, comorbidities and state of residence, inpatient mortality was highest among Asians, but similar among blacks and Hispanics, compared to whites (Table 1). To understand possible mediators of this association, we also examined for racial/ethnic differences in area-level indicators of SES, rural location, and provider availability. It showed that a lower proportion of Asians belonged to high poverty level and a majority of the Asians resided in large metropolitan areas (1+ million population) with high number of cardiologists available (Table 2). Among different Asian ethnicity groups compared to Chinese, the differences in inpatient AMI mortality did not attain statistical significance.

CONCLUSIONS: Despite more favorable socioeconomic status and provider availability indicators among Asian Americans, they had higher AMI inpatient mortality compared to whites, blacks and Hispanics. Further study is required to better understand the underlying causes.

Estimates of Disparities in Inpatient Mortality among patients admitted for AMI: Odds ratio (with 95 % confidence interval)

	Asian or Pacific Islander	Hispanic	Non-Hispanic Black	Other
AMI	1.29 [1.12, 1.47]	1.05 [0.97, 1.14]	0.95 [0.88, 1.03]	1.14 [1.02, 1.28]
STEMI	1.20 [0.98, 1.47]	0.95 [0.84, 1.08]	1.10 [0.97, 1.25]	1.23 [1.05, 1.46]
NSTEMI	1.35 [1.12, 1.63]	1.16 [1.05, 1.29]	0.95 [0.86, 1.06]	1.11 [0.95, 1.30]

Reference=non-Hispanic whites

Table 2 Racial/ethnic Differences in Area Level Socioeconomic Status and Provider Availability Indicators

	White	Black	Hispanic	Asian	Other
% Living in high poverty level areas	19	42	51	19	33
% Living in major metropolitan areas	56	79	67	88	71
% Living in areas with 16+ cardiologists/county	63	75	79	85	76

HIGHER LEVEL OF PATIENT-CENTERED MEDICAL HOME IMPLEMENTATION ASSOCIATED WITH IMPROVEMENTS IN CLINICAL QUALITY OF CARE IN THE NATION-WIDE VHA PACT INITIATIVE Ann-Marie Rosland^{3, 5}; Edwin Wong¹; Donna M. Zulman^{6, 7}; Rebecca I. Piegari⁴; Katherine Prenovost³; Stephan D. Fihn⁴; Karin M. Nelson^{1, 2}. ¹Northwest Center for Outcomes Research in Older Adults, Seattle, WA; ²University of Washington, VA Puget Sound, Seattle, WA; ³VA Ann Arbor, Ann Arbor, MI; ⁴Department of Veterans Affairs, Seattle, WA; ⁵University of Michigan Medical School, Ann Arbor, MI; ⁶VA Palo Alto, Palo Alto, CA; ⁷Stanford University, Palo Alto, CA. (Tracking ID #2198149)

BACKGROUND: In 2010, the Veterans Health Administration (VHA) began to establish patient-centered medical homes (PCMH) at all primary care (PC) clinics nationwide as part of the Patient Aligned Care Teams (PACT) initiative. PACT focuses on whole-clinic improvements in patient-centered care delivery, such as increased continuity and access and multi-disciplinary team-based care. PACT does not explicitly focus on care for specific medical conditions or patient populations. However, effective implementation of PCMH may have beneficial effects on care for chronic illness. This study examined whether extent of PACT implementation at individual VHA PC clinics by 2012 was associated with changes in chronic illness care between 2009 (pre-PACT) and 2013.

METHODS: Pre-post observational study of VHA's 955 PC clinics (serving >5 million patients). Using multivariate linear regression, we examined the association between clinics' PACT implementation and clinic-level change in 15 individual clinical quality indicators (CQI) for patients with diabetes (DM), hypertension (HTN), ischemic heart

disease (IHD), and heart failure (HF). CQI were collected by VHA's External Peer Review Program, in which external contractors manually abstract electronic health records to assess clinical performance using standardized criteria. Each indicator is expressed as the % of a clinic's qualifying patients who received guideline adherent care. PACT implementation was measured using the previously developed PI² score, an 53 variable index representing 8 PCMH domains, ranging from -8 (least extensive implementation) to +8 (most extensive). All models were adjusted for clinics' baseline value of the CQI measure, community vs. hospital-based clinic, rural vs. urban location, and area unemployment levels. Results are reported as model-based predictions for 2009–2013 change in proportion of patients receiving guideline adherent care for clinics with the least PACT implementation (PI²<-4) vs. those with the most (PI²>+4).

RESULTS: Overall, clinical quality was high. However, more extensive PACT implementation was significantly associated with larger improvements in 5 quality measures at $p<0.05$ and in 2 measures at $p<0.06$. Specifically, compared to clinics with the least PACT implementation, clinics with the most PACT implementation had significantly greater improvements in: annual LDL measurement in IHD (2009–13 predicted change +2.4 % vs. 0 %, $p<0.01$), LDL<100 in IHD (+7.8 % vs. +2.7 %, $p<0.01$) and DM (+3.1 % vs. +0.09 %, $p=0.06$), ACE inhibitor or ARB prescription for recent IHD with EF <40 % (+0.03 % vs. -0.02 %, $p<0.01$), blood pressure <160/100 in HTN (+0.8 % vs. -0.9 %, $p<0.001$) and DM (+0.2 % vs. -1.1 %, $p=0.03$), and annual HbA1c measurement in DM (+1.3 % vs. +0.5 %, $p=0.06$). Measures for which change over time was unassociated with PI² score were: aspirin prescription in CVD or DM; HbA1c<9 in DM; regular foot, retinal or renal function checks in DM; and HF with EF<40 % with ACE inhibitor/ARB prescription.

CONCLUSIONS: Over the period of initial PACT implementation, clinics with PACT most extensively in place by 2012 had significantly larger improvements in almost half of the chronic disease process and outcome quality measures examined. This study suggests that focusing resources on PCMH-aligned changes in care delivery across all patients may result in downstream improvements in quality of care and clinical outcomes for patients with specific chronic diseases.

HIV AND ASCVD RISK: AN EVOLVING DISEASE REQUIRES EVOLVING PREVENTION STRATEGIES Cameron Lambert; Pratik Sandesara; Laurence Sperling. Emory University School of Medicine, Atlanta, GA. (Tracking ID #2196424)

BACKGROUND: Premature ASCVD amongst HIV patients is a well-known complication of the disease and will become more prevalent as the life expectancy of HIV patients increases. The higher incidence of ASCVD in the HIV population is likely due to the increasing life expectancy of infected patients and HIV related non-traditional risk factors such as endothelial dysfunction. As the ability to control HIV infection evolves, so should clinicians' approach to ASCVD prevention strategies in these patients. Currently, risk factors are not often known, inconsistently identified and opportunities to modify risk are lost. This investigation aimed to 1) Describe the prevalence of common ASCVD risk factors in the HIV population and 2) Determine if an HIV population with elevated ASCVD risk received appropriate risk optimization.

METHODS: We examined data from the NHANES (National Health and Nutrition Examination Study) database from 1999–2012. We extracted the HIV population, their ASCVD risk factors and list of medications. Using the 2013 ACC/AHA pooled cohort risk assessment tool from the Guideline on the Assessment of Cardiovascular Risk, ASCVD risk was estimated.

RESULTS: HIV patients accounted for 0.53 % of the 22,384 surveyed subjects within the NHANES database ($n=119$). Thirty-four percent of these HIV patients reported taking antiretroviral therapy (ART). The HIV population was 67 % African-American ($n=80$), 73 % male ($n=87$) and had a median age of 39. Blood pressure was not optimally controlled (systolic blood pressure<110 mmHg) in 79 % of patients ($n=77$). Total cholesterol was not optimally controlled (<170 mg/dL) in 59 % of patients ($n=68$). Fifty-seven percent reported a smoking history ($n=68$) and 6 % were diabetic ($n=7$). The four groups likely to benefit from statin therapy according to the ACC/AHA guidelines were analyzed in this study. Those with proven ASCVD were not assessed given the lack of data. Of the 10 participants with 10-year ASCVD risk predictions greater than 7.5 %, only 1 was prescribed a statin. Two of six (33 %) patients aged 40 to 75 with diabetes and LDL 70–189 mg/dL were prescribed a statin. No HIV patients had LDL levels greater than 190 mg/dL.

CONCLUSIONS: ASCVD risk factors are highly prevalent in the HIV population. This may be due to virus-related factors, ART-related off target effects or epidemiologic differences. Prevention of morbidity and mortality in the HIV population must start with early detection of the viral infection. Aggressive risk factor modification strategies must be universally applied from the time of diagnosis to mitigate the ASCVD risk in the HIV population.

HOLDOVER SIGNOUT: CHARACTERISTICS OF NEW OVERNIGHT ADMISSION HANDOFFS Jonathan Duong²; Trevor Jensen²; Sasha Morduchowicz²; Stephanie Rennke¹; Lekshmi Santhosh²; Sarah Schaeffer²; James D. Harrison²; Bradley A. Sharpe¹; Sumant Ranji². ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA. (Tracking ID #2196931)

BACKGROUND: Resident duty hour restrictions have resulted in an increase in the number of new overnight admissions that are subsequently transferred to day teams. These "holdovers" make up about 40 % of all admissions to our teaching medicine service, however, little is known about the efficiency, safety and educational objectives of holdover signout. Our goal is to describe baseline characteristics of holdover signouts in an internal medicine residency program.

METHODS: We performed an observational cross sectional study using a convenience sample of morning holdover signouts between overnight admitting residents and receiving day teams on our inpatient medicine service. Receiving day teams consisted of medical students, interns, a resident, and an attending. Signout included the overnight resident presentation, closing the loop by the day team, and any teaching or constructive feedback by team members. Closing the loop consisted of after-presentation questions, clarifications, and to-dos, while constructive feedback included specific statements designed to acknowledge or improve overnight management. We audited the duration of each holdover signout, and the frequency of signouts with closing the loop, teaching moments, and immediate constructive feedback. A subset of holdover observations also measured the frequency of presentations with interruptions by team members and the duration of the overnight resident presentation, including patient data (history of present illness, review of systems, physical exam, social/family history, medications and laboratory data) and assessment and plan. We summarized the data using descriptive statistics.

RESULTS: We observed 61 holdover signouts performed by 47 residents, which are detailed in Table 1. The median holdover signout duration was 14.3 min. The receiving team closed the loop for all observed signouts. Teaching moments from team members occurred at a rate of 32.8 % while immediate constructive feedback did not occur. The subset data consisted of 34 holdover signouts, with the median resident presentation lasting 13.4 min. The patient data portion, all of which can be found in our electronic medical record (EMR), made up a median 62.0 % of the presentation time. Three presentations had interruptions by team members.

CONCLUSIONS: This is the first known reported data on holdover signouts. Holdover signout is a longer process than other signout and patient data available in an EMR may not need to be a substantial portion of holdover presentations. In addition, overnight admissions are a source of missed teaching and feedback opportunities for overnight residents. These findings suggest there may be a role for creating standard best practices to improve efficiency and education during the holdover signout process.

Holdover admission signout characteristics

Table 1: Holdover admission characteristics

Total observations (N=61)	% (n)	Minutes		
		Median	Min	Max
Frequency of closing the loop	100.0 (61)	—	—	—
Frequency of teaching moments	32.8 (20)	—	—	—
Frequency of feedback	0.0 (0)	—	—	—
Duration of entire holdover signout	—	14.3	7.3	43.0
Subset of observations (N=34)	% (n)	Median	Min	Max
Duration of patient data presentation	—	8.3	2.9	12.7
Duration of assessment and plan presentation	—	4.9	2.5	8.9
Total duration of resident H&P presentation	—	13.4	5.4	21.3
% of presentation consisting of patient data available elsewhere in EMR	—	62.0 %	52.0 %	72.0 %
Duration of closing the loop and teaching, if present	—	1.5	0.5	16.1
Frequency of interruptions	8.8 % (3)	—	—	—

HOSPITALIST AND SUBSPECIALIST PERSPECTIVES ON INPATIENT CONSULTATIONS Kelly Pacitti; Anne Mathew; Amanda Roysse; Dr. Kim Jordan; John Elliot, PhD. Riverside Methodist Hospital, Columbus, OH. (Tracking ID #2195936)

BACKGROUND: The growth of Hospitalist Medicine has changed the dynamic and practice of inpatient care. Early literature reported that hospitalist care reduces length of

stay (LOS) and costs; however, a recent JAMA study found both increased cost and LOS with increased hospitalist workload. Medical subspecialty consultation is a key component in the hospitalist's patient management with potential to affect both cost and quality measures. A study examining Medicare spending found increased costs in several regions in part secondary to specialist consultation. There is a paucity of literature on the interactions between the hospitalist and the medical subspecialist and effect on patient management. This study investigated perceptions on workload, perceived appropriateness of consultations, and communication between the hospitalist and the subspecialist.

METHODS: An anonymous practice pattern survey was sent to 656 hospitalists and 295 subspecialists (nephrologists and endocrinologists) across Ohio. Data on demographics, patient workload and communication methods were obtained. Responses to hyponatremia and diabetes ketoacidosis management questions were used to determine perceptions of need for consultation. Survey responses were dichotomized to "about half the time/mostly/always" vs "never/occasionally" as well as "low volume" (0–14 patients) and "high volume" (≥ 15 patients) for comparison purposes.

RESULTS: Survey combined response rate was 14.3 % (11.7 % hospitalists and 17.3 % consultants). Perceptions of communication differed: 100 % of hospitalists compared to 73.9 % (95%CI:60.7–87.1) of consultants answered that reason for consultation is stated "half the time/mostly/or always". Direct communication for urgent consults was reported by 97.3 % (95%CI:93.6–100.0) of hospitalists though 48.8 % (95%CI:32.8–64.8) of consultants reported receiving direct communication. More hospitalists with high census answered "never/occasionally" to direct communication with subspecialists than did hospitalists with low census: 71.7 % vs 37.9 %, $p=0.008$. Additionally, 38.3 % hospitalists with high census reported placing consults for medical conditions that a general internist could manage without assistance compared to 6.9 % of hospitalists with low census, $p=0.003$. Only 50.0 % (95%CI:38.5–61.5) of hospitalists reported that consultant input resulted in major management change vs 81.0 % (95%CI:68.6–93.3) of consultants. In particular, the groups differed on consultation need for hyponatremia management: 35 % (95%CI:12.6–58.0) of subspecialists felt consultation was appropriate compared to 5.3 % (95%CI:0.1–10.4) of hospitalists. Interestingly, 53 % of high census hospitalists reported that patient load interfered with management of glucose and sodium details the majority of the time compared to 24 % of low census hospitalists, $p=0.017$. Reasons listed for consultation requests per hospitalists included: medical-legal concerns (34.2 %, 95%CI:23.3–45.1) and spectrum of disease outside of clinical practice (66.2 %, 95 % CI:55.2–77.2). The majority of respondents in both groups reported that consultation did not shorten LOS.

CONCLUSIONS: Discrepancies exist in how hospitalists and subspecialists view their roles and impact on patient care. Though limited by small response rate, this survey highlights aspects of ineffective communication between these groups and their different perspectives on need for consultation, as well as the adverse impact of high census on patient management. Future work directed at improved communication and establishment of guidelines for appropriate consultation may improve and expedite the inpatient work-up and contribute to lower healthcare costs.

HOW NURSE CARE MANAGERS WORK WITH CHRONIC PAIN PATIENTS ON CHRONIC OPIOID THERAPY TO FACILITATE ADHERENCE TO CLINICAL GUIDELINES BY THE PRIMARY CARE TEAM Allison Lange^{1, 3}, Orlaith Heymann¹, Jane M. Liebschutz¹, Karen E. Lasser^{1, 4}, Christopher W. Shanahan^{2, 3}, Hannah S. Kopinski¹, Jawad M. Husain¹, Phoebe A. Cushman¹, Victoria A. Parker⁴.
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BACKGROUND: Caring for patients with chronic non-cancer pain who are chronic users of prescription opioids is challenging for healthcare teams due to provider time constraints, lack of consensus about optimal treatment, high risk of misuse and diversion of prescription opioids, and frequent co-occurring illicit drug use. Previous qualitative studies suggest improvement in patient understanding and self-treatment of chronic non-cancer pain after working with a Nurse Care Manager (NCM), but little is known about how NCMs accomplish these outcomes. No study to date has examined whether NCM-patient interactions help increase PCP adherence to chronic opioid therapy guidelines. Our objective is to describe the strategies an NCM uses for effectively interacting with patients on chronic opioid therapy in the context of a multi-component intervention, the Transforming Opioid Prescribing in Primary Care (TOPCARE) cluster randomized controlled trial. TOPCARE's overall goal is to improve opioid prescribing for chronic pain in primary care.

METHODS: We studied patients under the care of PCPs who had been randomized to the intervention arm of the TOPCARE study. We observed interactions that took place

between two NCMs and these patients. A convenience sample of 29 observations was utilized based on the availability of an observer at the time of appointments. Observers took notes using structured observation guides developed after two pilot observations. The structured guide included prompts to note NCM behaviors, patient behaviors, NCM expressed perceptions of risk, NCM feedback to the patient, and NCM goals (established in pre- or post-observation debrief). Whenever possible, observers captured verbatim quotes in the observation notes. Later the same day, the observer added content and context to the notes that had been observed but not recorded. We coded the observations using conventional content analysis and developed codes that best described the interactions. Subsequently, the team refined each code, and then sorted the codes into overarching themes that described different aspects of the NCM's actions. We used Nvivo v. 10 (QSR International, Cambridge, MA) to organize and analyze the data.

RESULTS: Five major strategies emerged from the data analysis. 1) The NCM put the rationale for intensive opioid management into context for the patient. The NCM framed his/her role on the patient's healthcare team, often by offering support for the patient. S/he also explained the reason for increased monitoring of the patient's opioid use. 2) The NCM collected information about the patient's life circumstances to determine their risk for opioid misuse. The NCM used several strategies for collecting information, including asking routine questions about substance use, psychiatric history, and current use patterns of the patient's pain medication to assess risk for opioid misuse. Additionally, the NCM asked open-ended questions and clarified the patient's behavior with probing questions. 3) The NCM coached patients to help them navigate their illness, medication use, and the healthcare system by offering clinical recommendations and giving information about how opioid medications work. 4) The NCM and the patient discussed discrepancies and changes to the patient's opioid prescriptions and chronic pain management plan. The NCM made observations about inconsistencies in the patient's story, and the patient explained the discrepancy either with a reason that did not violate the opioid treatment agreement or with admission to behavior violating the treatment agreement. The patient and NCM sometimes disagreed about the NCM's assessment and the patient and NCM arrived at different conclusions. 5) The NCM initiated a therapeutic relationship with patients by attempting to connect with them, make them feel comfortable, and by providing empathetic responses. All themes were observed across multiple NCM-patient interactions.

CONCLUSIONS: As a vital component of the healthcare team, NCMs collected information and used coaching strategies to encourage chronic non-cancer pain patients on chronic opioid therapy to participate in guideline-adherent practices with their primary care provider. To our knowledge, no other study has described how the NCM's activities with patients contribute to improved PCP provision of guideline adherent care. These findings will contribute to the successful replication of NCM intensive management strategies in other primary care settings.

HOW STRONG IS THE PRIMARY CARE SAFETY NET? ASSESSING THE ABILITY OF FEDERALLY QUALIFIED HEALTH CENTERS TO SERVE AS PATIENT-CENTERED MEDICAL HOMES Jamie Ryan, Pamela Riley. The Commonwealth Fund, New York, NY. (Tracking ID #2198640)

BACKGROUND: Federally Qualified Health Centers (FQHCs) are community-based clinics that provide comprehensive primary care and behavioral and mental health services regardless of patients' ability to pay. There is much debate surrounding how the implementation of the Affordable Care Act (ACA) is affecting these health centers' ability to accommodate increased demand. After implementation of state health reform in Massachusetts in 2006, health centers observed an increased demand for services among newly insured low- and middle-income residents. The ACA has the potential to similarly increase demand for services at FQHCs nationwide, elevating the importance of these centers' ability to provide quality, cost-effective care. A prior Commonwealth Fund study found that health centers that function as medical homes—that is, primary care practices that are able to provide high-quality, comprehensive, easily accessible, patient-centered care—are associated with the reduction, and even elimination, of racial and ethnic disparities in health care delivery and health status. In light of the reduction in disparities afforded by medical homes, it is important to study the implementation of the medical home model among primary care providers for the most vulnerable populations.

METHODS: Data come from the 2009 and 2013 Commonwealth Fund Surveys of Federally Qualified Health Centers that were conducted among a nationally representative sample of FQHCs. The 2009 survey was conducted by mail, online and by phone, March–May 2009; the 2013 survey was conducted by mail and online, June–October 2013. We created a 12-point scale of medical home capacity based on R. Nocon et al.'s Short-Form Safety Net Medical Home Scale. This scale assesses six domains of the medical home: Access and Communication, Patient Tracking and Registry, Care Management, Test and Referral Tracking, Quality Improvement, and External Coordination. We considered a health center to have high medical home capacity if it can perform at least nine of the 12

core functions; medium capacity is defined as meeting six to eight functions, while low capacity is defined as meeting fewer than five functions.

RESULTS: Federally qualified health centers exhibited a marked increase in their capability to function as medical homes from 2009 to 2013. The percentage of centers exhibiting high medical home capacity more than tripled, from 5 % in 2009 to 16 % in 2013. The majority of centers (61 %) exhibited medium or high medical home capacity in 2013; this is a marked improvement over 2009, when the majority (64 %) exhibited low medical home capacity. The greatest improvements were observed in the domains of patient tracking and registry functions and care management capacity, whereas health centers' performance actually decreased in the area of coordinating with external providers. Fewer than one-quarter of all centers reported easily obtaining specialist or subspecialist appointments (22 %) and procedures (22 %) for their Medicaid patients; these figures drop to 7 and 4 %, respectively, for uninsured patients. However, among those centers possessing the attributes of a medical home, these figures nearly doubled.

CONCLUSIONS: Our findings show that on the whole FQHCs have increased their capacity to serve as medical homes, and as such are likely better prepared to meet the increased demands they will face to effectively meet patients' needs under the ACA's coverage expansions. The progress experienced by FQHCs may be attributable in part to concerted efforts by the Bureau of Primary Health Care to prioritize medical home transformation among the nation's community health centers. Despite increasing medical home capacity among FQHCs, challenges persist with obtaining specialty care access for Medicaid and uninsured patients, a difficulty that is only anticipated to increase under the Affordable Care Act. Participation in integrated delivery systems, such as accountable care organizations, is one promising avenue to improve specialty care access for Medicaid beneficiaries served by FQHCs. However, additional support is needed to help community health centers overcome the financial and infrastructural challenges to participating in integrated care delivery models.

HUMAN PAPILLOMAVIRUS TESTING BY VETERANS ADMINISTRATION WOMEN'S HEALTH PROVIDERS: A PILOT STUDY Laura D. Hallett^{1,2}; Megan R. Gerber^{1,2}. ¹Boston University, Jamaica Plain, MA; ²Boston University Medical Center, Needham, MA. (Tracking ID #2201144)

BACKGROUND: Evidence-based guidelines have been created by professional societies, including the American Society for Colposcopy and Cervical Pathology (ASCCP) and United States Preventive Services Task Force (USPSTF), for use of human papillomavirus (HPV) cotesting in cervical cancer screening. Inappropriate use of HPV testing may lead to unnecessary procedures and added cost. We investigated whether Veterans Administration (VA) providers order HPV consistently with these guidelines. As more women veterans access VA care, it is critical to ascertain whether evidence-based care is delivered.

METHODS: To evaluate HPV ordering, we undertook a pilot chart review of all patients aged 18–65 for whom an HPV test was ordered in fiscal year 2014 at VA Boston. We collected data including patient age and gynecologic history to determine whether HPV testing was ordered according to USPSTF guidelines for screening and ASCCP guidelines for follow-up of abnormal cytology. If testing was inconsistent with guidelines, we examined whether the reason for HPV testing was documented in the chart. Reflex tests, added when the cytology showed ASC-US (atypical squamous cells of undetermined significance), were excluded from analyses since they were not ordered by providers. We also ascertained whether colposcopy was ordered subsequent to HPV testing.

RESULTS: We examined 210 charts of patients for whom HPV testing was ordered. One hundred forty-two patients (67.6 %) had an HPV test inconsistent with USPSTF and ASCCP guidelines. Of these, 90 had no reason for the test documented by the provider. For the 53 patients with a documented reason for HPV testing, the most common were history of cervical dysplasia, HPV positivity, and STI testing. Three tests were ordered at patient request. Of the 142 patients tested off guidelines, 62 had a history of abnormal cytology, and six had a history of CIN2, CIN3 or adenocarcinoma in situ. Patients reporting history of an abnormal pap were nearly three times as likely (age-adjusted OR 2.66 [1.45, 4.89]) to undergo guideline-based HPV testing as those with no such history. This relationship persisted when women under 30 ($n=31$) were removed from the analyses. Thirteen patients with a negative pap smear and positive HPV test were referred for colposcopy; of these 13, 10 tests were ordered in discordance with guidelines.

CONCLUSIONS: This study demonstrated potential overuse of HPV testing among women's health providers at one VA. Patients with abnormal pap histories had higher odds of having a test ordered according to guidelines, suggesting that providers may lack an understanding of HPV testing guidelines for screening healthy asymptomatic women. This knowledge deficit is further evidenced by use of HPV testing as STD screening. Because this study only examined cases in which HPV testing was ordered, a future study evaluating all women presenting for cervical cancer screening could examine the effect of

variables such as prior history of dysplasia on providers' decisions to order HPV testing. Development of an educational intervention or decision aid may improve VA providers' use of HPV testing guidelines.

HYPERTENSION KNOWLEDGE IMPACTS ANTIHYPERTENSIVE MEDICATION ADHERENCE Leonardo Tamariz¹; Irene Kirolos²; Ana M. Palacio¹. ¹University of Miami, Miami, FL; ²University of Miami-Miller School of Medicine, Miami, FL. (Tracking ID #2198200)

BACKGROUND: One-half of patients in the United States with hypertension have poorly controlled blood pressure. A major contributor to poor blood pressure control is poor adherence to prescribed antihypertensive medication therapy. However, reasons for nonadherence and strategies to improve it remain elusive. The purpose of this study is to evaluate the effect of hypertension knowledge and minority status on self-reported medication adherence.

METHODS: We conducted a cross-sectional evaluation of hypertensive patients attending their scheduled primary care visits at the Miami VA. We measured hypertension knowledge using a validated brief 10-question survey that evaluated understanding the definition of hypertension, its long term effects and lifestyle and behavior factors that might affect blood pressure control. We defined low hypertension knowledge if participants answered 3 questions incorrectly. Our outcome variable was medication adherence measured using 8-item Morisky Medication Adherence scale (MMAS-8). We calculated the prevalence of low hypertension knowledge and reported differences by race using ANOVA. We used linear regression to determine the beta coefficient of hypertension knowledge.

RESULTS: We recruited 125 Veterans with hypertension and a mean age of 61.6+/-9.1 of whom 29 % were Hispanic and 46 % were Black. The prevalence of low hypertension knowledge was 23 %; 95 % CI (19–27). White hypertensive patients had the highest hypertensive knowledge (8.7+/-0.9) compared to Hispanics (7.8+/-1.7) and Blacks (8.1+/-1.3) ($p=0.01$). Self-reported adherence was similar between all ethnicities ($p=0.57$). The beta-coefficient of hypertension knowledge for medication adherence was -0.33; 95 % CI -0.58 to -0.07 $p=0.01$ adjusted for demographics, health literacy and pill burden. The beta coefficient of the interaction between hypertension knowledge and ethnicity was -0.09 95 % CI -0.58 to 0.40 $p=0.71$.

CONCLUSIONS: Low hypertension knowledge is common among hypertensive veterans and this impacts medication adherence independent of ethnicity, pill burden and health literacy. Future studies evaluating interventions to improve adherence to blood pressure medications should include strategies targeting hypertension knowledge.

IDENTIFYING AND DEFINING CONTENT DOMAINS FOR A SCIENCE OF HEALTHCARE DELIVERY CURRICULUM: RESULTS FROM THE AMERICAN MEDICAL ASSOCIATION ACCELERATING CHANGE IN MEDICAL EDUCATION SYSTEMS-BASED PRACTICE WORKING GROUP Jed Gonzalo¹; Stephanie Star²; Michael Dekhtyar²; Jeffrey Borkan⁴; Susan Skochelak². ¹Penn State College of Medicine, Hershey, PA; ²American Medical Association, Chicago, IL; ³Mayo Clinic, Rochester, MN; ⁴Warren Alpert Medical School of Brown University, Providence, RI. (Tracking ID #2194944)

BACKGROUND: The emerging transformation in healthcare delivery, which includes a fundamental shift in the traditional physician role, requires an increased focus on an expanded set of competencies in systems-based practice (SBP), or the Science of Healthcare Delivery (SHCD). Although educators have called for an increased focus on SHCD curriculum topics, including interprofessional collaboration, quality and safety, and population health, the integration of these topics in undergraduate (UME) and graduate medical education (GME) has been limited. The incorporation of SHCD topics requires a clear and expansive understanding of potential topics that could be included in such a curriculum, which are independent of traditional basic and clinical sciences. However, definitions of "SBP" do not explicitly delineate educational topic areas, and the literature related to SHCD topics is scattered and seemingly opportunistic rather than comprehensive and synthetic. In 2013, the American Medical Association (AMA) awarded 11 grants to US medical schools to Accelerate Change in Medical Education (ACE). By leveraging the progress of the AMA's ACE grantee schools, in this study, we explicitly sought to develop a comprehensive content framework for a SHCD curriculum.

METHODS: The AMA's ACE SBP working group embarked on a two-phase project to address deficiencies in a comprehensive SHCD curriculum by investigating content areas currently or proposed-to-be implemented within 1 year at a sampling of US medical schools. Our investigation was sensitized by Engel's biopsychosocial model, allowing for a broad-based empirical lens to identify curriculum areas beyond the biomedical

components of physician-patient interactions, including subsequent levels in the social hierarchy from psychological to systems levels. First, we analyzed full grant submissions to the AMA's ACE grant program ($n=30$) to identify preliminary SHCD content domains and develop operational definitions for each. Using the process of constant comparative analyses, two investigators generated a preliminary codebook and analyzed segments of the dataset independently, with data management support from Atlas.ti™ 6.0 and NVivo™. At regular intervals, investigators compared codes for inconsistency and agreement, and updated and modified the codebook. Next, using these curriculum domains and definitions, participating AMA ACE schools ($n=11$) performed an in-depth assessment of curriculum documents and syllabi from all 4 years in their UME program to identify specific content areas within these domains.

RESULTS: Our preliminary analyses identified two categories of domains: curriculum domains and cross-cutting domains. Curriculum domains refer to content applicable to the SHCD, including: (1) Structures and Processes, e.g. resources, interprofessional collaboration, accountable care organizations, (2) Policy and Economics, e.g. the Affordable Care Act, insurance, reimbursement, (3) Clinical Informatics and Health Information Technology, e.g. electronic health records, point-of-care decision making tools, data registries, (4) Population and Public Health, e.g. population health interventions, community resources, (5) Socio-Ecological Determinants of Health, e.g. health disparities, cultural bias, (6) Value-Based Care, e.g. cost-conscious care, patient safety, and, (7) Health System Improvement, e.g. quality improvement principles. Cross-cutting domains referred to content traditionally addressed in UME curriculum, but now newly contextualized within content areas of a SHCD Curriculum, including leadership, teamwork, systems thinking, evidence-based medicine, ethics and professionalism, and scholarship.

CONCLUSIONS: In this investigation to develop a comprehensive framework for a SHCD curriculum, we identified 7 content and 6 cross-cutting domains currently applied in US medical schools. Traditionally, the term systems-based practice (SBP) has been used to address trainee competency at the UME and GME levels, however a comprehensive understanding of content domains potentially applicable to SBP have not been identified. These results provide the foundation for a comprehensive framework for a SHCD curriculum, and expand the working definition of SBP to include other critical components of the SHCD traditionally outside of teamwork and quality improvement. The identification of cross-cutting domains contextualized in a SHCD curriculum domains highlight the overlap of proposed "new" content areas with the traditional areas of curriculum, and reflect the need to reexamine and update curriculum to better align with current educational needs. These results can inform UME and GME programs developing SHCD curricula and the milestones and competencies related to the SHCD, and can catalyze the national conversation regarding the knowledge and skills required for physician trainees to become collaboratively effective, systems-based physicians.

IDENTIFYING CHALLENGES IN IMPLEMENTING SYSTEMS-BASED CURRICULUM: A QUALITATIVE ASSESSMENT OF MEDICAL STUDENT PERSPECTIVES Jed Gonzalo; Daniel R. Wolpaw; Paul Haidet. Penn State College of Medicine, Hershey, PA. (Tracking ID #2194911)

BACKGROUND: To foster the education of collaboratively effective, systems-based physicians, educators have recommended expanding the traditional basic science model to include systems sciences, such as population health, quality improvement, and high-value care. Despite these recommendations, educational programs still primarily focus on physician-centric knowledge and skills rather than systems abilities. With recommendations to expand systems sciences into undergraduate and graduate programs, educators must address the challenges involved with successfully integrating systems courses into the curriculum. To our knowledge, no studies have explored the challenges associated with integrating systems sciences. In 2013, our medical school received a grant from the American Medical Association to implement a new Systems Curriculum, which included an 18-month long course focused on insurance, cost, care coordination, population health, value, and teamwork, along with an experiential role for students to serve as patient navigators in the healthcare system. In support of our planning and design efforts, we undertook this study to identify "special pedagogical challenges" by exploring our students' understanding of systems-based practice and attitudes toward a systems curriculum.

METHODS: From December 2013 to February 2014, we digitally-recorded 11 focus groups with a purposive sample of 1st to 4th-year medical students at the Penn State College of Medicine. Our interview guide consisted of primarily open-ended questions that explored students' understanding of systems-based practice, their perceived benefits and barriers to implementing a systems curriculum, and factors that may diminish success of this initiative. Based on our literature review, student attitudes regarding systems curriculum and experiences were not identified, therefore we used a data-driven, inductive thematic analysis. The process of constant comparative analyses was used to identify initial themes and categories, and generate a preliminary codebook. Two investigators

independently analyzed an initial transcript and compared initial codes for agreement, and jointly adjudicated and updated the codebook. Then, the remaining transcripts were coded, with regular adjudication sessions. Disagreements were discussed and additional codes created and collapsed, and the codebook was subsequently modified.

RESULTS: Eleven focus groups were completed (41 total part) with three groups of 1st-year students ($n=11$), three groups of 2nd-year students ($n=13$), three groups of 3rd-year students ($n=11$), and two groups of 4th-year students ($n=6$). In our preliminary analysis, we found that although students struggled to define the phrase "systems-based practice," group discussion revealed a strong understanding of systems concepts and healthcare delivery. Several perceived benefits to a systems curriculum included the acquisition of systems knowledge and skills, enhanced understanding of patients' perspectives, and students' re-engagement with their motivations for entering medicine. Barriers were categorized into six themes: (1) primacy of traditional examinations, (2) lack of sufficient knowledge and skills to be effective with patients, (3) culture un conducive for systems science education, (4) a notion of systems topics as "non-essential" learning, (5) concern for lack of standardization of educational experiences, and, (6) "not my job." Underlying these findings was students' recognition of competing priorities - one to perform well on examinations and enter residency, and another to develop a skill set that includes abilities not necessarily tested on standardized examinations but critical to become a "good" physician.

CONCLUSIONS: Despite demonstrating uncertainty about the definition of "systems-based practice," students demonstrated a good working knowledge of systems concepts. Students reported several foundational perceived benefits for experiencing a new systems curriculum, including a focus on patient-centered experiences and perspectives. At the same time, the principal driver of students' motivations in medical school is achieving good examination and evaluation scores to improve chances of a successful residency match. Consequently, the introduction of new systems sciences, with limited penetration into board examinations or residency acceptance, would be viewed as "peripheral" and "non-essential." Students identified their primary external drivers of influence, such as board examinations, are often "at odds" with their intrinsic desire to pursue the core skills required to become a patient-centered, systems-savvy physician. Recognizing the success of any curriculum depends on student engagement, if the goal is to transform medical education to meet the evolving demands of medical practice, then educators must do more than introduce new curriculum. We must find creative ways to move from "important" to essential, and make systems-based learning "count" in the eyes of our students.

IDENTIFYING ONE PERSONAL DOCTOR IN CARE IS ASSOCIATED WITH HEALTH CARE SATISFACTION Joshua M. Liao^{1, 3}; Mark J. Ommerborn²; Cheryl R. Clark¹. ¹Brigham and Women's Hospital, Boston, MA; ²Brigham & Women's Hospital, Boston, MA; ³Harvard Medical School, Boston, MA. (Tracking ID #2199249)

BACKGROUND: Patient satisfaction with health care is a complex but important part of evaluating health care quality, value, transparency, and patient-centeredness. In some populations, satisfaction has been correlated with aspects of "personal care," defined as the ability to choose a personal doctor, establish a personal patient-physician relationship, or maintain regular sources of care. Known determinants of both satisfaction and aspects of personal care include race/ethnicity, socioeconomic status, health status, insurance status and delayed care. As value-based reform and new delivery models alter how patients and physicians interact, it is important to understand the association between personal care and satisfaction. However, there are limited available data from general population-based samples examining the relationship between having one or more personal doctor(s) as an aspect of personal care and health care satisfaction. Our analysis examines the association between the self-reported ability to identify a personal doctor and satisfaction in a nationally representative cohort of adults in the US. Our analysis tests the hypothesis that patients who identify a personal doctor in their care will be more satisfied with health care compared to those who are unable to identify a personal provider and those who identify multiple providers in their care.

METHODS: We analyzed cross-sectional data on 225,184 adults from the 2013 Behavioral Risk Factor Surveillance System, a state administered telephone survey of non-institutionalized US households. Health care satisfaction was assessed with the question "In general, how satisfied are you with the health care you received?" We compared individuals very satisfied with the care received with individuals somewhat or not at all satisfied with the care received. Having a personal provider was assessed with the question "Do you have one person you think of as your personal doctor or health care provider?" Responses included: yes, only one; more than one; or no. Descriptive statistics were described by percentages and compared by χ^2 tests. To estimate the odds of being very satisfied with care associated with having a personal provider, we fit weighted logistic regression models adjusted for age, sex, race/ethnicity, delayed health care, time since last doctor checkup, the number of doctor visits in the past year, health insurance status,

cardiovascular disease, diabetes, self rated health status, body mass index, employment status, education and income. Wald-F tests were used for all tests of significance. Statistical analysis was performed in SAS-callable version of SUDAAN (version 9.0.1) using sampling weights to account for the complex survey design. Statistical analysis used two-tailed significance tests at the 0.05 alpha level.

RESULTS: Adults with a personal doctor were generally very satisfied with their health care (68 % very satisfied vs. 32 % somewhat or not satisfied). Adjusting for age and sex, adults with no personal doctor [OR 0.48, 95 % CI (0.46–0.51)] or more than one personal doctor [OR 0.77, 95 % CI (0.72–0.81)] were less likely to be very satisfied with care compared to adults who identified a single personal doctor (Table 1). Similarly, adjusting for other covariates—race/ethnicity, socioeconomic status, delayed care, frequency of doctor visits, health insurance status, and self-rated health and co-morbid conditions—those with no personal doctor [OR 0.65, 95 % CI (0.62–0.69)] or more than one personal doctor [OR 0.85, 95 % CI (0.80–0.91)] were less likely to be very satisfied with care.

CONCLUSIONS: In this large national cohort, satisfaction with care was associated with a number of factors, including patients' ability to identify one personal doctor in their care compared to none or more than one such doctor. As new delivery models affect patient care, our results suggest that health care satisfaction might be promoted in part through policies and changes that preserve the personal relationships between patients and physicians.

Odds Ratios for Satisfaction with Health Care Received among Adults in the United States, 2013 BRFSS

Odds Ratios^a (95 % CI)

Data from Centers for Disease Control and Prevention 2013 Behavioral Risk Factor Surveillance Survey. Analysis performed among the $N=255,184$ participants with complete data on all covariates. Notes. ^aMultivariable logistic regression models weighted with rlogit function in SUDAAN. ^bModel adjusted for age and sex. ^cModel adjusted for age, sex, delayed health care, time since last doctor checkup, the number of doctor visits in the past year and health insurance status. ^dModel adjusted for age, sex, health care access variables, cardiovascular disease, diabetes, self rated health, and body mass index. ^eModel adjusted for age, sex, health care access variables, health variables, race/ethnicity, employment status, education, income and statistically significant interaction between education and income.

IMPACT OF AN INNOVATIVE INPATIENT PATIENT NAVIGATOR PROGRAM ON LENGTH OF STAY AND 30-DAY READMISSION Janice L. Kwan¹; Matthew W. Morgan¹; Thomas E. Stewart²; Chaim Bell¹. ¹Mount Sinai Hospital, Toronto, ON, Canada; ²Niagara Health System, St. Catharines, ON, Canada. (*Tracking ID #2198799*)

BACKGROUND: Inpatient medicine is becoming increasingly complex. Efforts to minimize hospital length of stay (LOS) have resulted in patients being discharged "quicker and sicker". This has prompted the need for adaptive innovation. However, there is limited data describing hospital-based interventions targeting improvements in communication and transitional care. We created a new position, the patient navigator (PN), a dedicated patient care facilitator not responsible for clinical care. PNs were integrated into the inpatient multidisciplinary clinical team to facilitate patient and provider navigation through the complexity of a hospital admission by enhancing communication between and among patients and providers.

METHODS: We implemented the PN program in our 90-bed inpatient general medicine service in June 2010 on 2 of 4 multidisciplinary clinical teams. We expanded to all 4 teams in May 2011. PNs acted as liaisons between and among providers and patients. They attended daily care rounds, expedited consultations and tests, and were available to patients and family members via a dedicated mobile number. They answered questions related to test scheduling and consultations, and promptly relayed care questions to the clinical team. They also assisted in discharge coordination by arranging follow-up appointments, placing phone calls, and serving as primary contact following discharge. We evaluated the PN program using a retrospective cohort study that included all general medical admissions between July 2010 and March 2014 matched by case mix group, age category, and resource intensity weight. There were no exclusion criteria. Our primary outcomes were LOS and 30-day readmission rate. Patients who died, were transferred to or from an acute care facility, or signed out against medical advice were excluded from the 30-day readmission analysis. A secondary analysis restricted the timeframe from July 2010 to April 2011, when only 2 of 4 teams were exposed to PNs. Data were obtained from institutional databases. Mean values were compared using 2-sided t-tests and categorical groups using χ^2 tests. This study was approved by the hospital research ethics board.

RESULTS: Our matched cohort included 7841 admissions (3414 patients), with 5628 admissions (4593 patients) exposed and 2213 admissions (1921 patients) not exposed to PNs. The two groups were similar (Table 1). Admissions with PNs were 1.3 days (21 %

shorter (6.2 vs 7.5 days, $P<0.001$). The restricted analysis found a 1.2 day (18 %) lower LOS (6.4 vs 7.6 days, $P<0.05$). Thirty-day readmission rate was not different between the 2 groups (13.1 vs 13.8 %, $P=0.48$) or in the restricted analysis (12.0 vs 13.5 %, $P=0.40$) (Table 2).

CONCLUSIONS: We describe an innovative inpatient intervention featuring an integrated patient care facilitator not responsible for clinical care. Implementation was associated with a 21 % reduction in LOS without an increase in 30-day readmission. Ineffective communication is a common cause of poor patient outcomes in hospital-based care. This phenomenon can be amplified from external pressures to maximize productivity. PNs may offload care demands by enhancing communication for providers and patients. Our preliminary return-on-investment calculations suggest that the savings incurred from shorter LOS outweigh program costs. Our limitations include potential bias from unmeasured confounders and single-center design. Also, 30-day readmission rates were only captured for our institution, although the majority of readmissions in our region are to the index facility, and are unlikely to differ between the 2 groups. Our experience shows promise and may inform others considering similar interventions. Patient and provider experience and generalizability should be evaluated in future work.

Patient characteristics

	With PN (n=5628)	Without PN (n=2213)
Age (mean, SD)	69 (20)	68 (20)
Female sex (n, %)	3018 (53.6)	1196 (54.0)
Most responsible diagnosis (n, %)		
Chronic obstructive pulmonary disease	271 (4.8)	88 (4.0)
Pneumonia	374 (6.6)	135 (6.1)
Congestive heart failure	217 (3.9)	87 (3.9)
Admission location (n, %)		
Home	4665 (82.9)	1943 (87.8)
Long-term care	524 (9.3)	158 (7.1)
Discharge location (n, %)		
Home	3824 (67.9)	1578 (71.3)
Long-term care	779 (13.8)	267 (12.1)

Mean length of stay (LOS) and 30-day readmission rate for admissions with and without patient navigators (PNs) from July 2010-March 2014 (primary analysis) and July 2010-April 2011 (secondary analysis)

	With PN (n)	Without PN (n)	P-value
July 2010-March 2014			
LOS (days, 95 % CI)	6.2 (6.0–6.4) (5628)	7.5 (7.1–7.9) (2213)	<0.001
30-day readmission rate (%)	13.1 (5055)	13.8 (2012)	0.48
July 2010-April 2011			
LOS (days, 95 % CI)	6.4 (5.8–7.0) (713)	7.6 (6.8–8.3) (753)	<0.05
30-day readmission rate (%)	12.0 (627)	13.5 (681)	0.40

IMPACT OF AN OVERNIGHT INTERNAL MEDICINE ACADEMIC HOSPITALIST PROGRAM ON PATIENT OUTCOMES Jed Gonzalo¹; Ethan Kuperman²; Cynthia H. Chuang¹; Erik B. Lehman²; Thomas W. Abendroth¹. ¹Penn State College of Medicine, Hershey, PA; ²Pennsylvania State University, Hershey, PA; ³University of Iowa Carver College of Medicine, Iowa City, IA. (*Tracking ID #2194871*)

BACKGROUND: Due to concerns for patient safety and quality of care, the Institute of Medicine (IOM) and Accreditation Council for Graduate Medical Education (ACGME) have increased requirements for trainee supervision, including that an attending-level supervisor be immediately available during all shifts. In response, many academic programs have implemented overnight academic hospitalists (OAH) to improve clinical care and meet these supervisory requirements. Despite the belief that on-site supervision with OAHs improves patient safety and outcomes, there is little evidence describing the impact of an OAH program on patient-level outcomes. In 2012, our hospital implemented an OAH program, with explicit patient care and resident education responsibilities. We sought to: (1) compare patient-level outcomes before and after implementation of the OAH program, and, (2) to describe OAH revenue generation and contributions to teaching and patient care during the first-year of the OAH program.

METHODS: In September 2012, our academic medical center implemented an OAH program, which included one faculty-level attending physician providing on-site, direct house staff supervision of clinical duties during the night hours (7 pm–7 am). Prior to

implementation, patients were cared for by three internal medicine house staff; attending faculty were not present on-site, but were continuously available via telephone. We compared patient outcomes before and after OAH implementation by conducting a retrospective medical record review of all patients admitted to the internal medicine service over a 37-month period; all patients aged 18 and older admitted between April 1, 2011, and August 26, 2012 (pre-implementation), and August 27, 2012, and May 31, 2014 (post-implementation) between 7:00 pm–6:59 am were eligible for inclusion. Primary outcomes included: (1) in-hospital mortality, (2) 30-day hospital readmissions, (3) hospital length of stay, (4) upgrades in care to intensive care unit during the night of admission or the hospital stay. Patient-level covariates hypothesized to influence the primary outcomes included age, gender, race, ICD9 codes, and mortality risk scores. We obtained billing records of physician charges and administered prospective daily work logs to OAHs to capture tasks performed not obtained by the electronic medical record. Comparisons between dichotomous outcomes were assessed with chi-square tests, and between the continuous outcome using student's t-tests. To adjust for underlying temporal changes, we used an interrupted time series with segmented logistic regression.

RESULTS: During the study period, 6484 patients were admitted to the internal medicine service: 2722 (42 %) and 3722 (58 %) after implementation. Patients admitted before and after implementation were similar with respect to age (63.5 vs. 63.4 years, $p=0.47$), gender (44.6 % vs. 46.2 % female, $p=0.69$), race (89 % vs. 88 % white, $p=0.11$), and APR-DRG mortality risk scores. There were no differences found in mortality (1.1 % vs. 0.9 %, $p=0.23$), 30-day readmissions (14.8 % vs. 15.6 %, $p=0.2$), length of stay (4.43 vs. 4.39 days, $p=0.38$), or upgrades in care to intensive care the night of admission (0.4 % vs. 0.7 %, $p=0.07$) or during hospitalization (3.5 % vs. 4.2 %, $p=0.19$) in patients before and after implementation. During the first year of the program, the OAHs billed 1219 patient encounters (3.1/shift) and 63 procedures (0.2/shift), and accrued \$500,000 in charges. Of 365 eligible shifts, 317 work logs were completed (87 %); OAHs reported staffing/billing 2.6 new patient admissions before midnight and 0.9 new patient admissions after midnight per shift; 156 procedures were supervised or performed independently (0.5/shift). Central venous catheters were the most common procedure performed ($n=102$, 65 % of total). The OAHs spent <10 min per shift discussing patient care issues with interprofessional providers.

CONCLUSIONS: There were no differences in mortality, 30-day readmissions, patient length of stay, and upgrades in care to the intensive care unit when comparing these outcomes before and after implementation of an OAH program. Based on billing data, the revenue generated by OAHs was modest, and insufficient to cover the positions' salaries. Although the assessed outcomes may be too infrequent or insensitive to detect an impact, the financial return on investment of the OAH role is questionable. The OAH role may fulfill requirements of the Clinical Learning Environment Review Program (CLER) to focus on quality of care and supervision, but nighttime presence of an attending physician may limit the autonomy and independence of graduate trainees required for professional development. With increasing use of OAHs, close monitoring of the degree and quality of direct on-site supervision is required to preserve the essential aspect of house staff education.

IMPACT OF HIGH DEDUCTIBLE INSURANCE ON DIABETES OUTPATIENT AND HIGH ACUITY CARE: THE NATURAL EXPERIMENTS FOR TRANSLATION IN DIABETES (NEXT-D) STUDY James F. Wharam¹; Fang Zhang³; Emma Eggleston¹; Christine Lu¹; Stephen B. Soumerai¹; Dennis Ross-Degnan². ¹Harvard

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BACKGROUND: High deductible health plans (HDHP) will soon be the predominant commercial insurance benefit in the US, and the Affordable Care Act will dramatically increase enrollment. HDHPs require potential annual out-of-pocket costs of \$1000–\$6000 for most services and might reduce appropriate health care, especially among the poor and sick. Almost nothing is known about the impact of modern HDHPs on chronically ill patients, and nothing is known about effects on low-income, high morbidity patients. Our objective was to examine the impact of HDHPs on diabetes outpatient and high acuity care.

METHODS: Our data source was claims data of commercially insured members of a large national health plan. We studied patients with diabetes who were continuously insured for at least 2 years between 2004–2012 and included 26,862 whose employers mandated a transition from low-deductible ($\leq \$500$) to high deductible ($\geq \1000) coverage. Our inclusion of only patients who experienced such “forced” transitions to HDHPs minimizes selection bias. We classified 9668 (36 %) of these HDHP members as lower income based on residence in neighborhoods with at least 10 % of families living below poverty. We performed employer- and member-level 1:1 propensity score matching based on multiple baseline characteristics (including age, gender, morbidity, US region of residence, income-/education-level, race/ethnicity, and costs) to contemporaneous diabetes patients whose employers offered only low-deductible coverage. We censored matched pairs simultaneously to remove attrition bias. We assessed annual rates of primary care and specialist visits, HEDIS outpatient quality measures (hemoglobin A1C, LDL, and microalbumin testing), high severity emergency department visits, and hospitalizations for 1 year before and 2 years after mandated switch from traditional to HDHPs, compared with controls. We used annual difference-in-differences Poisson regression with generalized estimating equations to calculate adjusted pre-to-post changes in the HDHP group versus the control group.

RESULTS: Among HDHP members versus controls, primary care and specialist visits declined by approximately 3 to 6 % in follow-up years 1 and 2 relative to baseline in both the overall and lower-income HDHP group (Table). We found no detectable changes in HEDIS measures of hemoglobin A1C, LDL, or microalbumin testing. The overall HDHP group experienced no changes in high severity emergency department visits (–9.8 % [–22.4 %, 2.8 %] and 0.8 % [–20.9 %, 22.5 %] in follow-up years 1 and 2, respectively) whereas the lower-income group had corresponding reductions of 17.3 % (–34.7 %, 0.2 %) and 25.2 % (–49.7 %, –0.7 %). Similarly, lower-income HDHP members with diabetes reduced hospitalizations by 13.2 % (–24.0 %, –2.4 %) and 22.3 % (–38.9 %, –5.6 %) in follow-up years 1 and 2, respectively, relative to controls. Hospitalization changes were less pronounced in the overall cohort.

CONCLUSIONS: HDHP members with diabetes reduced primary care and specialist visits to a small degree and experienced no changes in HEDIS outpatient quality measures. However, lower-income HDHP members with diabetes experienced substantial and concerning reductions in high severity emergency department visits and hospitalizations. Findings indicate a need for longer-term studies of higher risk HDHP members with low income and high morbidity. Policy interventions such as targeted cost sharing exclusions and education for vulnerable members might also be needed.

Changes in outpatient and high acuity care among HDHP members with diabetes versus controls.

	Relative Change from Baseline to Follow-up Year 1, HDHP Group vs Controls			Relative Change from Baseline to Follow-up Year 2, HDHP Group vs Controls		
	Estimate	(95 % CI)		Estimate	(95 % CI)	
Overall						
Primary Care Visits	–3.7 %	(–5.2 %,	–2.1 %)	–3.0 %	(–5.9 %,	0.0 %)
Specialist Visits	–5.5 %	(–7.8 %,	–3.2 %)	–5.9 %	(–10.3 %,	–1.6 %)
>=2 HbA1C Test/Year	–1.3 %	(–3.7 %,	1.0 %)	–3.1 %	(–7.2 %,	1.0 %)
>=1 LDL Test/Year	–0.1 %	(–1.6 %,	1.3 %)	–0.7 %	(–3.4 %,	1.9 %)
>=1 Microalbumin Test/Year	–0.7 %	(–3.5 %,	2.2 %)	–1.0 %	(–5.8 %,	3.8 %)
High Severity ED Visits	–9.8 %	(–22.4 %,	2.8 %)	0.8 %	(–20.9 %,	22.5 %)
Hospitalizations	–7.2 %	(–14.5 %,	0.1 %)	–15.4 %	(–26.7 %,	–4.1 %)
Lower-income						
Primary Care Visits	–5.5 %	(–7.9 %,	–3.0 %)	–6.4 %	(–11.0 %,	–1.7 %)
Specialist Visits	–4.9 %	(–8.9 %,	–1.0 %)	–6.3 %	(–13.6 %,	1.1 %)
>=2 HbA1C Test/Year	–1.6 %	(–5.7 %,	2.5 %)	–5.9 %	(–13.1 %,	1.4 %)
>=1 LDL Test/Year	–1.4 %	(–4.0 %,	1.1 %)	–4.2 %	(–8.7 %,	0.3 %)
>=1 Microalbumin Test/Year	–0.8 %	(–5.9 %,	4.3 %)	–0.4 %	(–9.4 %,	8.5 %)
High Severity ED Visits	–17.3 %	(–34.7 %,	0.2 %)	–25.2 %	(–49.7 %,	–0.7 %)
Hospitalizations	–13.2 %	(–24.0 %,	–2.4 %)	–22.3 %	(–38.9 %,	–5.6 %)

IMPACT OF INTERACTIVE WORKSHOP AND WEB-BASED TOOL ON KNOWLEDGE OF CKD MANAGEMENT AMONG INTERNAL MEDICINE RESIDENTS Swati Arora; Richard Marcus; Jia Zhang; Bhavna Chopra; Khaled Nashar; Kalathil Sureshkumar. Allegheny General Hospital, Pittsburgh, PA. (Tracking ID #2191614)

BACKGROUND: Chronic Kidney Disease (CKD) is a growing epidemic affecting more than twenty million adults in United States. A large proportion of CKD population is under-recognized, especially in primary care setting and hence, sub-optimally diagnosed and managed. This is likely due to lack of emphasis on CKD management during training and inadequate availability of quick and easy decision support tools.

METHODS: In this study, we conducted a baseline assessment of Internal Medicine residents' knowledge in areas of: screening and diagnosis of CKD, anemia (A), bone-mineral disease (B), control of BP (C) and degree of proteinuria (D). We then conducted 90-min long interactive workshop on ABCD of CKD in small groups' format over a period of 5 weeks. This was followed by a post-test at the end of the workshop to evaluate the effectiveness of the intervention. The residents were subsequently provided access to a self-developed online resource on key concepts of CKD management (www.nephromania.com).

RESULTS: A total of 98 residents (PGY1-38, PGY2-30, PGY3-30) completed the workshop. About 22 % of residents were aware of KDOQI guidelines (5 % PGY1, 25 % PGY2, 43 % PGY3) before intervention versus 96 % post intervention (97 % PGY1, 97 % PGY2, 100 % PGY3), $p < .001$. While 98 % residents would screen asymptomatic diabetics or hypertensive's for CKD, only 28 % would consider screening in patients with recurrent UTIs and 60 % in patients with positive family history of CKD. This improved post-intervention to 88 and 85 %, $p < 0.01$, respectively. Results are summarized in Table 1.

CONCLUSIONS: Short term intervention with interactive workshops on ABCD of CKD management was very effective in improving recognition of CKD and identification of complications. Lack of improvement in management of hypertension in CKD patients post-intervention could be reflective of lack of consensus amongst various guidelines. A three-month follow up study is planned to evaluate long term retention with web-based tool and to assess real world impact on patient care using systematic chart review.

Table 1: Pre and Post Test Results

	Pre-test	Post-test	P-value
Awareness of KDOQI guidelines	22 %	96 %	<0.001
Accurate Recognition of CKD based on:			
Duration > 3 months	82 %	99 %	<0.0001
Degree of decline in eGFR	70 %	93 %	<0.001
Degree of ACR	28 %	58 %	<0.001
Anemia Goals:			
Hb-10-12 g/dL	92 %	99 %	NS
Interpretation of iron studies	46 %	87 %	<0.001
Bone Mineral Disease Workup:			
Hypocalcemia	66 %	75 %	NS
Hyperphosphatemia	84 %	91 %	NS
25-hydroxy Vitamin D	57 %	93 %	<0.0001
Secondary Hyperparathyroidism	88 %	96 %	<0.05
Metabolic acidosis	88 %	97 %	<0.05
Hypertension & Proteinuria Management:			
Goal Blood Pressure	49 %	58 %	NS
Screening for proteinuria	77 %	89 %	NS
First choice of anti-hypertensive	47 %	39 %	NS
Health Maintenance:			
Influenza vaccine	98 %	98 %	NS
Pneumovax	60 %	96 %	<0.0001
Hepatitis B	57 %	90 %	<0.0001
Referral to Nephrology			
eGFR < 30 ml/min	92 %	95 %	NS
eGFR 30-45 ml/min	62 %	19 %	<0.001
Anemia of chronic disease for Erythropoietin	22 %	42 %	<0.01
Secondary hyperparathyroidism	55 %	65 %	NS

eGFR- Estimated glomerular filtration rate, ACR- Albumin creatinine ratio

IMPACT OF LABORATORY PRICE DISPLAY ON RESIDENT ATTITUDES AND KNOWLEDGE ABOUT COSTS Theodore Long²; Tasee Bongiovanni¹; Meir Dashevsky¹; Andrea Halim¹; Joseph S. Ross²; Robert L. Fogerty¹; Mark Silvestri¹. ¹Yale School of Medicine, New Haven, CT; ²Yale University School of Medicine, New Haven, CT. (Tracking ID #2192807)

BACKGROUND: Cost awareness is a common program requirement designated by the Accreditation Council for Graduate Medical Education (ACGME). However, studies to date have shown that physicians are unaware of costs in patient care, and previous educational interventions to increase cost awareness have had mixed results. We therefore sought to measure sustained change in resident physician attitude toward and knowledge of costs after a comprehensive price display intervention for all laboratory order prices in our electronic health record.

METHODS: In March 2014, we conducted an anonymous, cross sectional survey of all Internal Medicine, Pediatrics, Combined Internal Medicine and Pediatrics, Obstetrics & Gynecology, Emergency Medicine, and Orthopaedic Surgery residents at Yale-New Haven Hospital (YNHH) examining knowledge of and attitudes toward cost in health care. Participants estimated dollar value costs of selected laboratory and imaging tests. In April 2014, the Medicare allowable reimbursements for all laboratory orders were displayed in the YNHH electronic medical record. After the laboratory price display had been present for 6 months, we repeated our survey of the same target population. We performed a Wilcoxon Ranked Sum test for the unpaired attitude responses and a Wilcoxon Signed Rank test for the paired responses of participants before and after the price display intervention. The cost estimate questions were considered accurate if responses were between 50 and 200 % of the Connecticut-specific Medicare price. This range was established by prior studies of physician cost knowledge. Laboratory prices were obtained from the 2014 Medicare laboratory fee schedule. Radiology prices were obtained by summing values from the Medicare Physician Fee Schedule (professional fees) and the Medicare Outpatient Prospective Payment System Fee Schedule (facility fees). Student's t-tests were used to assess accuracy in the cost estimate portion of the survey pre- and post-intervention.

RESULTS: We received 403 completed surveys (overall response rate of 68.7 %). Prior to the intervention, 8.6 % of residents agreed or strongly agreed that they knew the costs of tests they ordered. After the intervention, this increased to 38.2 % ($p < 0.001$). The proportion of residents agreeing or strongly agreeing that they had adequate access to cost information improved from 1.0 % pre-intervention to 24.8 % post-intervention ($p < 0.001$). After the laboratory price display intervention, price estimate accuracy increased significantly for both laboratory and radiology orders. Laboratory accuracy increased from 23.7 to 52.4 % ($p < 0.001$). Radiology accuracy increased from 38.0 to 49.6 % ($p = 0.001$). For both the knowledge and attitude questions, there were no meaningful differences between specialties or between the paired and unpaired analyses.

CONCLUSIONS: We found that residents felt more comfortable with their knowledge and access to cost information after the price display intervention. Residents demonstrated significant improvement in accuracy of price estimation, which persisted 6 months after the intervention was implemented. Although prices were only displayed for laboratory orders, the improvement in estimates for both laboratory and radiology prices suggests that providing cost information for some orders may have a spillover effect for provider cost knowledge.

IMPACT OF LORCASERIN IN OBESE AND OVERWEIGHT PATIENTS WITH PREDIABETES ON WEIGHT LOSS AND REDUCING PROGRESSION TO DIABETES Richard Nesto¹; Randi Fain²; Yuhua Li²; William Shanahan³; William Soliman². ¹Lahey Hospital and Medical Center, Burlington, MA; ²Eisai Inc, Woodcliff Lake, NJ; ³Arena Pharmaceuticals, San Diego, CA. (Tracking ID #2198444)

BACKGROUND: Modest weight loss (WL; 5 %) may improve glycemic control and reduce diabetes risk. Lorcaserin (LOR), a selective 5-HT_{2C} agonist, is an approved adjunct to lifestyle intervention for chronic weight management in obese/overweight patients. This post hoc analysis evaluated if LOR (10 mg twice daily [BID]) would reduce progression from prediabetes to diabetes over 1 year compared with placebo (PBO); all patients received diet/exercise counseling.

METHODS: Data were pooled ($N = 6136$) from the BLOOM/BLOSSOM trials (body mass index of 30-45 kg/m² or 27-29.9 kg/m² with ≥ 1 weight-related comorbid condition, nondiabetic). Prediabetes was alternatively defined as hemoglobin A1c (HbA1c) 5.7-6.4 or fasting plasma glucose (FPG) 100-125 mg/dL. Diabetes was alternatively defined as HbA1c ≥ 7 at any time, ≥ 6.5 at least once post baseline and taking antidiabetic medications, or ≥ 6.5 at least twice post baseline or FPG > 125 mg/dL any time and with antidiabetic medications or at least twice post baseline.

RESULTS: Among the 1148 LOR- and 1117 PBO-treated patients with prediabetes at baseline (HbA1c criteria), more experienced 5 or 10 % WL with LOR (56, 29 %) vs PBO (28, 11 %). Three percent of LOR and 6 % of PBO patients ($p = 0.017$) developed diabetes. More patients with prediabetes experienced a reduction in HbA1c (< 5.7) with LOR than PBO (40 vs 30 %; $p < 0.001$) at week 52 without developing diabetes any time after baseline. Among 563 LOR- and 570 PBO-treated patients with prediabetes at baseline (FPG criteria), more experienced 5 % or 10 % WL with LOR (53, 27 %) than PBO (29,

10 %). Two percent of LOR and 3 % of PBO patients ($p=0.327$) developed diabetes; however, many patients experienced a reduction in FPG (<100 mg/dL; 52 % LOR, 47 % PBO; $p=0.047$).

CONCLUSIONS: Progression from prediabetes to diabetes (by HbA1c criteria) occurred in significantly fewer patients treated with LOR than PBO. A greater proportion of patients with prediabetes at baseline achieved 5 and 10 % weight loss with LOR compared with PBO over 52 weeks.

IMPACT OF MEDICAL HOME TRANSFORMATION ON BREAST CANCER SCREENING Amy Baughman¹; Phyllis Brawarsky¹; Tracy Onega²; Tor Tosteson²; Anna N. Tosteson²; Jennifer Haas¹. ¹Brigham and Womens Hospital, Boston, MA; ²Geisel School of Medicine at Dartmouth, Lebanon, NH. (Tracking ID #2198480)

BACKGROUND: Among women in the US, breast cancer is the most common cancer and is the second most common cause of cancer death. Primary care plays a critical role in breast cancer screening and detection. One primary care model that may improve the use of screening is the patient-centered medical home (PCMH), which involves physician-led multidisciplinary teams and aims to optimize care coordination, communication and access to care. Many primary care practices are adopting PCMH models of care. Understanding whether PCMH transformation is associated with changes in breast cancer screening is important given the large burden of disease and anticipated primary care shortage. We evaluated whether a higher score on a medical home assessment for primary care practices, indicating that a practice is closer to functioning like a PCMH, is associated with the use of breast cancer screening. We hypothesized that PCMH transformation would be associated with increased screening because of enhanced care coordination, care processes, and patient engagement.

METHODS: This was a retrospective cohort study that included women aged 50 to 74 in the PROSPR (Population-based Research Optimizing Screening through Personalized Regimens) registry who had at least one primary care visit to one of 13 participating Brigham and Women's Hospital (BWH)-affiliated primary care clinics between April 2012 and December 2013. Women were excluded if they had a prior history of breast cancer ($n=2085$) or died during the follow-up period ($n=279$). Beginning in 2012, BWH began measuring PCMH transformation using a framework called "Primed Status" which was modeled on the NCQA requirements for medical home recognition. The "Primed Status" score was assessed quarterly for each practice based on achieving the following elements: use of electronic health records (EHR), patient web-based portal access, team-based care, practice redesign and process improvement, and high risk patient care management. We evaluated an aggregate 0 to 100 "Primed Status" score based on the percentage of elements achieved. A score was assigned for each primary care visit for each woman. Covariates included patient age, race/ethnicity, education level, insurance status, family history of breast cancer, comorbidity, date of visit, and marital status. We examined 3 outcome measures, as medical home transformation may facilitate care between visits in addition to visit-based care, including whether or not: (1) screening was up-to-date at a visit (mammography completion within the 24 months prior to the visit); (2) screening was up-to-date at a visit OR if screening was due at a visit (no mammogram completion in prior 24 months), whether timely screening was completed within 3 months after the visit, (3) timely screening was completed within 3 months of the visit if screening was overdue at the time of the visit. We used logistic regression to examine the impact of medical home transformation on each outcome, adjusting for the above confounders. The unit of analysis was the primary care visit. Regression analyses were clustered at the level of the practice.

RESULTS: The cohort included 20,349 women. The number of primary care visits totaled 94,014; women were up-to-date at 76,332 (81 %) visits for 13,700 (67 %) women; women were due for screening at 17,682 (19 %) visits for 6649 (33 %) women. In visits where women were due for screening, screening was not completed within 3 months for a majority of the visits (13,625 (77 %) visits with no screening vs. 4057 visits with screening). All 13 practices had improvements in their "Primed Status" scores over the study period; the average practice score increased from 25 % in the first quarter to 81 % in the final quarter. At visits where screening was up-to-date, increases in Primed Status scores were associated with less screening after adjustment and this was statistically significant (Table 1, Model 1); however, this model did not account for women who went on to have timely screening within 3 months. Timely screening completion when overdue was not associated with higher scores (Table 1, Model 3) after adjustment. Finally, when evaluating the combination of visits where screening was up-to-date and completed within 3 months if overdue, screening was again not associated with better scores (Table 1, Model 2).

CONCLUSIONS: In this setting, improved medical home scores were not associated with higher rates of breast cancer screening. Medical home transformation initiatives may not adequately target prevention.

Multivariable Logistic Regression Odds Ratios for Primed Status Score (10 point change) and Breast Cancer Screening

Model	OR (95 % CI)	P Value
1) Screening up-to-date at visit	0.91 (0.87, 0.97)	<0.001
2) Screening up-to-date at visit OR Screening within 3 months if overdue at visit	0.97 (0.90, 1.04)	0.18
3) Screening within 3 months if screening was overdue at visit	1.06 (0.88, 1.27)	0.58

IMPACT OF PRIMARY CARE ON COLORECTAL CANCER SCREENING IN A SAFETY NET HEALTH SYSTEM Oanh K. Nguyen^{1,1}; Bijal A. Balasubramanian^{2,1}; Joanne Sanders¹; Jasmin Tiro¹; Wendy P. Bishop¹; Chul Ahn¹; Ethan Halm^{1,1}. ¹UT Southwestern Medical Center, Dallas, TX; ²University of Texas School of Public Health, Dallas, TX. (Tracking ID #2198257)

BACKGROUND: Colorectal cancer (CRC) is the second leading cause of cancer deaths in the US; however, only 59 % of adults are up to date with CRC screening. Screening rates are even lower among underserved populations such as the uninsured and minorities. Completion of CRC screening is particularly challenging due to the need to complete a multi-step process rather than a single test. Though health systems are promoting outreach strategies to increase initiation of CRC screening outside of an office-based visit, we hypothesized that primary care providers (PCP) nonetheless remain critical to facilitating completion of all steps of CRC screening. Thus, we sought to evaluate the association between PCP visits and delivery of CRC screening processes, from ordering and completion of initial screening tests to appropriate follow-up of abnormal initial screening with ordering and completion of further diagnostic testing.

METHODS: Retrospective cohort study of adults 50–64 years of age not up to date with CRC screening at an integrated safety net health system in Dallas, Texas. We included individuals who had an 'index' PCP visit on or after January 1, 2010, regularly received care in the system (≥ 1 outpatient visit within 12 months before or after the index visit) and had at least 12 months of follow-up time after the index visit. The date of the index visit was considered the date of cohort entry. Individuals were excluded if they were ≥ 65 years old, moved out of Dallas County, or died within 12 months of index visit due to limited follow up data. Our four outcomes corresponded to key steps in CRC screening: 1) initial order of a fecal immunochemical test or fecal occult blood test (FIT/FOBT), or screening colonoscopy; 2) completion of initial FIT/FOBT or colonoscopy; 3) order of a diagnostic colonoscopy after abnormal FIT/FOBT results; and 4) completion of diagnostic colonoscopy. For outcomes #1 and #2, we assessed the association with the number of PCP visits 12 months after the index visit; for outcomes #3 and #4, we assessed the association with the number of PCP visits 12 months after the date of abnormal FIT/FOBT. Odds ratios were estimated using multivariable logistic regression adjusted for age, sex, race/ethnicity, payer, comorbidities, and clinic type.

RESULTS: Of 32,376 individuals, the overwhelming majority were black (40 %) or Hispanic (36 %), female (64 %), and received county-sponsored charity care (68 %). Over a quarter (29 %) had multiple chronic conditions (Charlson comorbidity index ≥ 2). The mean number of PCP visits was 2.4 ± 2.2 in the 12 months after cohort entry. Of the total study population, 25,818 (79.8 %) had an initial CRC screening test ordered and 22,029 (68.0 %) completed initial testing. Only 799 (2.5 %) had an abnormal FIT/FOBT; of these, 92.3 % had orders for follow-up diagnostic colonoscopy but only 51.7 % actually had a follow-up colonoscopy. Compared to those with no PCP visits after the cohort entry, those with ≥ 1 PCP visit had significantly higher adjusted odds of receiving an order for and completing an initial screening test; a higher number of PCP visits was associated with increasing adjusted odds of initial screening test ordering and completion, demonstrating a dose-dependent relationship (Table). Among those with an abnormal FIT/FOBT, having ≥ 1 PCP visit after an abnormal FIT/FOBT was also associated with higher adjusted odds of both having a follow-up colonoscopy ordered and completed compared to having no visits during this time interval (Table).

CONCLUSIONS: Increasing primary care visits are associated with increased CRC screening initiation and completion. Though many health systems are employing outreach strategies to bolster CRC screening outside of office settings, PCPs are likely to continue to play an important role in the delivery of CRC screening.

Table. Effect of Primary Care Visits on Key Steps of Colorectal Cancer Screening ^a

	Number of primary care visits			
	0	1	2	3
Initial screen ordered ^b	[Reference]	2.53 (2.33–2.74)	3.53 (3.24–3.85)	4.08 (3.77–4.41)
Initial screen completed ^b	[Reference]	2.22 (2.06–2.40)	3.12 (2.90–3.37)	3.88 (3.61–4.16)
Follow-up ordered ^c	[Reference]	4.09 (1.96–8.54)	5.82 (2.45–13.82)	5.96 (2.76–12.84)
Follow-up completed ^c	[Reference]	3.30 (2.14–5.10)	4.29 (2.72–6.76)	5.05 (3.25–7.86)

^aAll values presented are adjusted odds ratios (95 % confidence interval) unless otherwise specified.

^bInitial screening test order and completion were assessed for the entire study population (N=32,376).

^cFollow-up testing order and completion were assessed only among individuals with an initial abnormal FIT/FOBT result (N=799).

IMPACT OF REGIONALIZED CARE ON PREVENTABLE ADVERSE EVENTS ON GENERAL MEDICINE SERVICES Stephanie Mueller¹; Kyla Giannelli²; Robert Boxer¹; Jeffrey L. Schnipper². ¹Brigham and Women, Boston, MA; ²Brigham and Women's Hospital, Boston, MA. (Tracking ID #2197622)

BACKGROUND: Failures in communication among healthcare personnel are known threats to patient safety. Inpatient medical units are particularly vulnerable to ineffective communication given the varied work structure of each care team member. The goal of this study was to examine the impact of regionalized unit-based care teams on preventable adverse events (AEs).

METHODS: We performed a retrospective cohort study of 400 randomly selected patients discharged from general medicine services before and after implementation of regionalized care (200 each), which consisted of restructuring 3 general medicine teams such that nurses and physicians cared for patients on the same unit. Patients were eligible for inclusion if they were discharged from the general medicine service from one of these units between April 1–June 19, 2013 (pre) and 2014 (post). Electronic medical records were reviewed by a trained clinician using a validated screening tool, and narrative summaries were created for any potential AE. We defined AE as an injury due to medical management (that occurred on the study unit) rather than the natural history of the illness. Two of four adjudicators separately reviewed each narrative using a validated 6-point confidence scale to determine the presence and preventability of AE (i.e., a rating of ≥ 4) classified AEs using a 4-point severity scale, and grouped AEs into 1 of 10 pre-specified categories. Disagreements in ratings were discussed by all adjudicators to reach consensus. We performed logistic regression to evaluate the impact of regionalized care on the odds of having a preventable AE, accounting for clustering by discharge unit and controlling for patients' demographics, payer, length of stay, comorbidities, and case mix. Secondary outcomes included severe preventable AEs and category of preventable AEs.

RESULTS: Of the 400 patient screens, 8 were excluded due to missing MRN (5) and discharge outside of included dates (3). Of the final 392 patient screens (198 pre, 194 post) there were 133 total AEs (66 pre, 67 post), 27 preventable AEs (13 pre, 14 post), and 9 severe preventable AEs (4 pre, 5 post). There was no significant difference in the adjusted odds of preventable AEs after implementation of regionalized care compared to before (OR 1.37, 95 % CI 0.65, 2.89). Similarly, there was no difference in severe preventable AE or in category of preventable AE.

CONCLUSIONS: We found that implementation of regionalized unit-based care teams had no significant impact on preventable AEs. Our results indicate that regionalized care alone is likely insufficient to affect major patient safety outcomes, although more subtle improvements due to better team communication may not have been captured with our methodology. However, strengthening the infrastructure to maximize opportunity for communication between all care team members can facilitate implementation of additional initiatives that may lead to more robust patient safety improvements.

IMPLEMENTATION OF A PATIENT CARE MANAGEMENT PROGRAM TO REDUCE DISPARITIES AND CONTROL HYPERTENSION IN PRIMARY CARE (RED CHIP): A PRAGMATIC TRIAL Tanvir Hussain^{2,4}; Whitney K. Franz⁴; Emily L. Brown⁴; Athena Kan⁴; Mekam T. Okoye²; Kara Taylor⁴; Katherine Dietz⁴; Jennifer Halbert⁴; Arlene Dalcin⁴; Cheryl A. Anderson^{4,3}; Romsai T. Boonyasai^{1,4}; Jill A. Marsteller⁴; Lisa A. Cooper^{2,4}. ¹Johns Hopkins University SOM, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD; ³University of California San Diego, La Jolla, CA; ⁴Johns Hopkins Center to Eliminate Cardiovascular Health Disparities/Health Disparities, Baltimore, MD. (Tracking ID #2198962)

BACKGROUND: Despite the availability of evidence-based interventions for hypertension (HTN) treatment, data on approaches for delivering them in real-life clinical practice are sparse, particularly in nonadherent, disadvantaged, and/

or African American populations, groups which are regularly excluded in randomized, efficacy studies. Thus, we conducted a pragmatic trial to determine the feasibility, reach, and effectiveness of care management (CM) as an approach for implementing evidence-based interventions to improve blood pressure (BP) control amongst hypertensive patients, with particular attention to African Americans (AA), in a routine clinical care setting.

METHODS: In this pragmatic, non-randomized, multisite trial, we staggered implementation of a CM program, incorporating evidence-based strategies for HTN treatment, across six primary care practices in the Baltimore metropolitan area between 2010–2015. Four sites care for underserved communities with large AA populations. Any and all HTN patients ≥ 18 years with uncontrolled BP ($\geq 140/90$) within the last 6 months, receiving primary care at study sites, were eligible. Delivered completely by the clinic staff, the CM program invited eligible patients to participate in 2 h of in-person CM—three sessions, over approximately 2 months. Registered Dietitians (RDs) and Doctors of Pharmacy (PharmDs) trained in motivational interviewing and cultural competency educated patients about HTN; developed personalized action plans to encourage adherence to medications, diet, physical activity, and use of self-monitoring behaviors; and taught patients health-related problem solving. We measured program reach by tracking the flow of patients from eligibility to CM completion, including the number of eligible patients who were successfully contacted by CM, and the number attending session 1 and finally completing all three sessions. We also evaluated the effectiveness of the program in improving systolic and diastolic BP between the time of outreach/referral (pre-intervention) and the end of care management sessions (post-intervention, 3 months from session 1) employing a quasi-experimental analytic technique, which accounts for secular trends. Using a difference in differences (DID) term from a cross-sectional time series regression model, we compared patients who completed all three sessions to those who completed only one or two sessions (dropouts) and to a 10 % random sample of non-participants. All analyses were stratified by race.

RESULTS: Results are available for patients from five sites. Of the 1969 eligible patients identified from the electronic medical record, care managers were able to contact 1329 (67 %) during outreach calls, and 143 (7.3 %) of these patients attended session 1. Primary care providers, who identified additional patients during routine care, referred the additional 310 patients who attended session 1. Of the 453 patients who started CM, 156 (34 %) completed all three sessions. Among all session 1 participants, pre-intervention BP was 150/88, age 57 years, 58 % female, 66 % African American, with mean BMI of 34.5 kg/m²; there were no baseline differences between dropouts, non-participants, and those completing all sessions. However, those completing all three sessions experienced a significantly greater BP improvement at follow-up compared to non-participants [DIDs for systolic BP 14 mmHg SBP ($p=0.001$), diastolic BP 6 mmHg ($p=0.001$)] and compared to dropouts [DIDs for systolic BP 7 mmHg ($p=0.001$), diastolic BP 3 mmHg ($p=0.001$)]. Though AAs and Whites both experienced BP improvement, Whites experienced greater benefit. Compared to non-participants, Whites completing all sessions demonstrated DIDs in systolic BP of 16.1 mmHg ($p=0.001$) and in diastolic BP of 5.2 ($p=0.009$), whereas for AAs it was 7.2 mmHg ($p=0.008$) and 3.1 mmHg ($p=0.011$); interaction terms between race and DIDs were statistically significant.

CONCLUSIONS: CM comprised of RDs and PharmDs trained in motivational interviewing and cultural competency is a feasible approach for implementing evidence-based HTN treatment in a variety of primary care settings and can result in blood pressure control among HTN patients after just a few sessions. However, the very limited reach of CM and its decreased effectiveness among African Americans raise caution. For CM to improve population health and reduce disparities in HTN, methods for enhancing engagement among all patients and addressing further the barriers faced by AAs specifically must be identified.

IMPLEMENTATION OF THE PATIENT CENTERED MEDICAL HOME (PCMH) IN THE VETERANS HEALTH ADMINISTRATION (VHA): ASSOCIATIONS WITH CLINICAL OUTCOMES, PATIENT SATISFACTION, PROVIDER BURNOUT AND HEALTH CARE USE Karin M. Nelson^{4, 3}; Philip W. Sylling⁷; Edwin Wong²; Leslie Taylor⁴; Christian D. Helfrich⁵; Idamay Curtis⁷; Gordon Schectman⁶; Richard Stark¹; Stephan D. Fihn⁷. ¹Department of Veterans Affairs, Washington, DC; ²Northwest Center for Outcomes Research in Older Adults, Seattle, WA; ³University of Washington, VA Puget Sound, Seattle, WA; ⁴VA, Seattle, WA; ⁵VA Puget Sound Healthcare System, Seattle, WA; ⁶Veterans Affairs Central Office, Milwaukee, WI; ⁷Veterans Health Administration, Seattle, WA. (Tracking ID #2198377)

BACKGROUND: In 2010, the Veterans Health Administration (VHA) began implementing the patient centered medical home (PCMH). To evaluate progress and outcomes system wide, we examined the association of PCMH implementation in 2012 and 2013 with important outcomes including patient satisfaction, staff burnout, health care use and clinical quality.

METHODS: We conducted an observational study using: (1) VHA clinical and administrative data for >5.6 million Veterans who received primary care at 923 VHA hospital- and community-based outpatient clinics (CBOCs); (2) $n=279,841$ responses to the Consumer Assessment of Health Plans PCMH module administered to a weighted, random sample of Veterans who received outpatient care in 2013; and (3) 6959 responses to a survey distributed to all VHA primary care providers and staff in 2013. **Measures:** To measure PCMH implementation, we utilized a previously validated instrument, the PACT implementation progress index (PI²) comprised of 53 items from 8 core PCMH domains: access, continuity, care coordination, comprehensiveness, self-management support, patient-centered care and communication, shared decision-making and team-based care. In order to assess site PI² performance across years, we used 2012 as a reference year, and standardized 2013 items in the PI² index by the 2012 average and standard deviation of items across sites. A 2013 overall PI² score was assigned to each clinic based on the number of domains in the top and bottom 2012 quartiles for the domain scores, ranging from 8 (all domain scores in the top 2012 quartile) to -8 (all domain scores in the bottom 2012 quartile). Our main outcome measures were patient satisfaction (defined by a provider rating from 0 to 10), staff burnout (measured by a single item question), health care use (hospitalization and emergency room use), and VHA clinical quality indicators. **Statistical analysis:** We used a non-parametric test of trend for the ranks across ordered groups to test for trends in patient satisfaction and provider burnout by PI² scores. We examined 2013 utilization of emergency department and urgent care visits and total hospitalizations for high versus low implementation sites, adjusting for age, CBOC clinics and co-morbidity. To assess how trends in hospitalizations changed following the PACT initiative in 2010, we estimated time-series models of ambulatory care sensitive condition (ACSC) hospitalizations and all-cause hospitalizations from 10/1/2003 through 9/2013 for each facility. Changes in hospitalizations were calculated as the difference between the observed rate of admissions and the predicted rate of admissions that would have occurred had PACT not been implemented, during the period after PACT initiation. We tested differences in proportions of eligible patients at each VHA clinic fulfilling each of 44 quality indicators by the degree to which implementation of PACT was successful, as measured by the PI². We calculated rates of services at the facility level by dividing the number of patients who satisfied the quality measure by the number of patients who met inclusion criteria for each quality measure.

RESULTS: PCMH areas with the greatest gains from 2012 to 2013 included the percentage of Veterans using secure email messaging with their providers, the percentage of patients enrolled in home tele-monitoring, increased use of telephone clinics, and increased clinic staffing to recommended ratios. Among sites achieving the most effective implementation, we found improvements in patient satisfaction, provider burnout, and emergency room utilization. Patient satisfaction was meaningfully higher among sites that had effectively implemented PACT than those that had not (mean rating for satisfaction with provider 9.24 vs. 7.74, $p<0.001$). A similarly favorable pattern was observed for staff burnout (34 % vs. 44 % of staff reporting burnout, $p=0.011$). Emergency department and urgent care encounters were marginally lower at sites with more rather than less effective implementation (205 vs. 222 encounters per 1000 patients, $p=0.091$). No difference was noted in all-cause hospitalization. However, in the interrupted time series analysis, sites with 2013 PI² scores in the highest decile had higher rates of ACSCs and all-cause hospitalization. Seventeen of 44 clinical performance measures were significantly associated with PI² scores, with more effective PCMH implementation associated with higher quality, including LDL cholesterol of <100 for patients with IHD (64.1 % vs. 72.8 %, $p<0.001$) or diabetes (64.1 % vs. 70.8 %, $p<0.001$), influenza immunization (74.8 % vs. 78.6 %, $p=0.021$), and offering medications for tobacco cessation (94.1 vs. 96.4 %, $p=0.044$). Overall, 38 of the 44 measures were higher at sites with the highest PI² scores.

CONCLUSIONS: Sites with sustained levels of PCMH implementation had higher patient satisfaction, lower provider burnout and better clinical quality.

IMPLEMENTING A WEB-BASED INTERVENTION TO IMPROVE BREAST CANCER CARE COORDINATION IN SAFETY-NET HOSPITALS: BARRIERS, FACILITATORS & OPPORTUNITIES FOR IMPROVEMENT Nina A. Bickell³; Jenny J. Lin¹; Bonnie Bellacera²; Kelsey Murray⁴; Rebeca Franco³; Ann S. McAlearney⁴. ¹Mount Sinai, New York, NY; ²Mount Sinai School of Medicine, Hicksville, NY; ³Mount Sinai School of Medicine, New York, NY; ⁴The Ohio State University, Columbus, OH. (Tracking ID #2200263)

BACKGROUND: Minority breast cancer patients tend to have higher rates of adjuvant treatment underuse. We implemented a web-based intervention that closes referral loops between surgeons and oncologists at inner-city hospitals serving high volumes of minority breast cancer patients to assist these hospitals to improve care coordination. We then conducted follow-up interviews with key personnel to improve our understanding of the intervention implementation and to identify barriers, facilitators, and opportunities for improvement.

METHODS: We interviewed 59 administrative and clinical key informants from 11 hospitals participating in the intervention study. Interviews were recorded and transcribed verbatim. We used the constant comparative method of analysis to code interview transcripts and identify common themes regarding intervention implementation.

RESULTS: We identified implementation barriers, facilitators and opportunities at both the hospital and intervention levels. Hospital-level implementation barriers were lack of staff time, large patient panels, the diverse needs of patient populations served, and the need to incorporate the intervention into existing workflow. Intervention-related barriers included technical issues for some hospitals due to existing firewalls and limitations of the intervention itself such as use with a defined patient population (e.g., English and Spanish-speaking patients only). Implementation facilitators at the hospital-level were having staff with dedicated administrative time, involvement of the entire care team in the care coordination process, the existence of a strong policy for following up patients who missed appointments, as well as a unified electronic medical record. Intervention-level facilitators included the push notifications sending reminders about no shows, and that the intervention was implemented at different systems, so patients could be tracked regardless of the system in which they received care. An important hospital-level opportunity to improve intervention implementation would be to enable hospitals to take advantage of care coordination systems already in place so that the intervention is perceived as supplemental rather than competing with existing workflows and work-arounds. Further, the intervention itself could be enhanced by permitting care coordination of all breast cancer patients (i.e., not restricted by language or cancer stage), as well as developing functionalities such as the ability to create a master patient list, query the tracking system, and track progress on care coordination goals.

CONCLUSIONS: Coordination of care for women with breast cancer is extremely important, but safety-net hospitals face considerable resource constraints from lack of time, support, and information systems. We found substantial barriers to implementing an intervention designed to support care coordination efforts, despite initial feedback that the intervention itself was both easy to use and in line with organizational goals. As safety-net hospital networks grow expanding across numerous care sites, the challenge of care coordination will likely increase, highlighting the importance of interventions that can be successfully implemented and used to promote better care.

IMPLEMENTING INTERPROFESSIONAL, GRADUATE LEVEL, GERIATRIC PRIMARY CARE EDUCATION: REFLECTIONS ON YEAR 1 OF A NEW PROGRAM Allison Squires²; Jennifer Adams¹; Sherry A. Greenberg²; So-Young Oh¹; Lisa Altshuler¹; Tara Cortes². ¹NYU School of Medicine, New York, NY; ²New York University, New York, NY. (Tracking ID #2198520)

BACKGROUND: Preparing and deploying a primary care workforce ready to care for the aging global population requires increasing efficiency in graduate level health professions education while ensuring competence in interprofessional practice. Training programs need to meet population health needs while also addressing the challenges of coordinating training schedules of diverse professionals, many of whom are practicing professionals. This study reports on the first year program evaluation of a unique nurse practitioner and physician training program focused on improving geriatric interprofessional care in the primary care setting. The program intervention included a week long joint educational program with physicians and nurse practitioners, online learning modules, and follow up learning exercises. Faculty designing the program included experienced geriatric nurse practitioners, primary care graduate level physician educators, an instructional technologist, and a behavioral scientist.

METHODS: Evaluation data for the study drew from multiple sources including pre and post intervention focus group interviews with 10 student participants (8 MD, 2 NP), performance reports from the online learning modules, surveys about perceptions about

interprofessional teamwork and practices, course evaluations, and faculty reflections. We conducted general descriptive analyses appropriate for the data type. The small sample size limited statistical comparison for significant differences between respondents.

RESULTS: In the interviews participants emphasized how program training sites negatively limit the ability to deliver quality geriatric primary care and apply classroom content in the “real world”. Participants also reported feeling uncomfortable providing feedback about other professions when in the same room. Issues around leadership also emerged as power dynamics between professions influenced perceived roles and responsibilities. Perceptions of quality of interprofessional collaboration at the current site of clinical practice remained nearly the same before (6.56/10) and after (6.2/10) the intervention. Perceptions of team leadership and serving as an equal contributor trended upward after the intervention. Overall perceptions of interprofessional collaboration on existing teams at their training sites, however, trended largely downward. Participants, in short answer questions, felt least comfortable addressing geriatric care issues related to patient safety, end of life care situations, communication, and work allocation. Synthesizing all the results suggest that this type of program may be effective in improving geriatric content overall but in an interprofessional education context, may sensitize learners to broader issues around geriatric primary care delivery, such as appropriate use of different roles on the healthcare team.

CONCLUSIONS: Rich data from this first year of a 3 year study is informing the development of interprofessional geriatric primary care training programs, which could help health professions schools reinforce and address interprofessional care delivery issues that may predictably arise after this type of intensive educational intervention. It is also noteworthy that the role of the training site in reinforcing or undermining appropriate delivery of geriatric specific care cannot be ignored.

IMPLEMENTING PCMH ONE TEAM AT A TIME: THE USE OF COACHING SESSIONS TO CHANGE EVERYDAY CLINIC PRACTICE ^{Lauren E. Weston⁴; Claire Robinson³; Adam Tremblay^{4, 5}; Clinton L. Greenstone⁴; Molly Harrod¹; Jane Forman².}

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BACKGROUND: Patient-centered medical homes (PCMH) are being implemented in primary care clinics throughout the United States. PCMH principles emphasize providing patients with continuous and coordinated care using a team-based approach. This approach requires a shift from the traditional, physician-centric model to one where care is shared among team members. This shift necessitates a redesign of how staff relate to and work with one another. In 2010, the Veterans Health Administration began implementing its version of the PCMH. In order to facilitate VA's PCMH, one VA primary care clinic employed a “coaching” model to aid and support their staff in the transition to a team-based model of care. Current literature tends to focus on the components necessary to conduct coaching sessions (e.g., time and space for teams to meet, education regarding the changes needed etc.) Less is known about how teams implement these changes within the clinic environment. Therefore, our objective was to understand how coaching sessions were translated into everyday practice and what, if any, impact these sessions had on PCMH implementation.

METHODS: We used qualitative methods to examine how staff who participated in coaching sessions used their experiences to design team-based processes that were then implemented within day-to-day clinic operation. We observed 19 coaching sessions over a 9 month period. We then conducted semi-structured interviews with team members (N=13) who were observed in the sessions. We analyzed both the field note and interview data using a descriptive approach comparing the planning of activities that occurred during the coaching sessions with how they described their clinic experiences in the interviews.

RESULTS: We found that clinic teams used the coaching sessions to develop processes that supported the implementation of the VA's PCMH. During the coaching sessions, some teams reviewed their access performance reports together leading them to develop strategies that would result in improved access. Some of these strategies included adding additional nurse clinics, extending established patients' non-urgent return visits and moving some appointments to non-traditional options, such as phone visits. Furthermore, because the coaching sessions were team-based, all team members were able to participate in the development of new processes by providing input and taking on new tasks. This was especially true for licensed practical nurses (LPNs) who, prior

to PCMH, were considered underutilized by all team members. LPNs began making pre-appointment phone calls to prepare patients for upcoming visits, during which they requested that patients bring medications and any outside records to their appointment, asked that they arrive early for bloodwork, and got a better overall sense of the patients' needs. During sessions, the teams would also spend time talking about individual patients who needed additional support. We heard the team members brainstorming about other healthcare professionals they could involve in patients' care, such as pharmacists to assist with medication adherence issues and telehealth to help monitor patients' conditions between visits. This helped alleviate some of the workload and, perhaps more importantly, tailored the care to the patient. Coaching sessions also provided the team an opportunity to give feedback to the coaches and one another about how they thought the processes were working. Some processes needed constant revisiting because either the team was having difficulty implementing them or the system was not set up to support them. For example, one strategy that was proposed by clinic leadership was the use of huddles so that the team could get together every day at a set time to discuss, based on the patients being seen, what was needed. However, most teams felt that they accomplished this goal throughout the day, as needed. This approach was more conducive to how they worked and communicated with one another while in clinic. Coaching sessions provided the opportunity for teams to discuss and adjust clinic processes that were not working well for the team.

CONCLUSIONS: We found that coaching sessions were an optimal way to support PCMH implementation. Although most current literature recommends a more prescribed way of conducting coaching sessions, we found that a combination of formal education about the changes necessary for PCMH implementation and the opportunity for teams to decide how those changes were to be made were an effective approach in aiding the transition to team-based care. We also found that coaching should be done over a period of time allowing teams to test out new processes and provide feedback to one another about what works, what does not work, and why. Given time, teams are able to make adjustments that fit how the team works rather than how individuals work.

IMPLICATIONS OF CHANGING TO THE CHA2DS2-VASC SCORING SYSTEM TO RISK STRATIFY PATIENTS WITH ATRIAL FIBRILLATION FOR ANTICOAGULATION THERAPY IN AN INTEGRATED SAFETY NET HEALTH SYSTEM ^{Sarah L. Anderson^{2, 1}; Carolyn A. Valdez¹; Tara B. Vlasimsky¹; Carlos Irwin Oronce¹; Joel C. Marrs^{2, 1}; Samuel D. Richesin¹; Rebecca Hanratty¹.}

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BACKGROUND: Due to improved risk stratification of atrial fibrillation (AF) patients, the 2014 American Heart Association/American College of Cardiology/Heart Rhythm Society Atrial Fibrillation Guidelines recommend utilizing the CHA2DS2-VASc score (1 point each for heart failure, hypertension, diabetes mellitus, vascular disease, age 65–74 years, or female gender, and 2 points each for age ≥75 years or previous stroke or transient ischemic attack [TIA]) over the previously recommended CHADS2 score (1 point each for heart failure, hypertension, diabetes mellitus, age ≥75 years, and 2 points for previous stroke or TIA) to determine those patients who would derive the most benefit from anticoagulation. A CHA2DS2-VASc score of 0 warrants no anticoagulation. Patients with a CHA2DS2-VASc score of 1 are recommended to receive no therapy, aspirin, warfarin, or a non-vitamin K antagonist oral anticoagulant (NOAC). Patients with a score of ≥2 should receive either warfarin or a NOAC. Implementation of the CHA2DS2-VASc scoring system will result in more patients qualifying for anticoagulation therapy compared to the CHADS2 score. Our objective was to determine the magnitude of the change in risk score when utilizing the CHA2DS2-VASc scoring system.

METHODS: We identified 913 patients diagnosed with AF who attended one or more primary care visits over a 2-year period within an integrated safety net health care system. We risk stratified patients using both the CHADS2 and the CHA2DS2-VASc scoring systems as low- (score of 0), moderate- (score of 1), or high-risk (score ≥2).

RESULTS: When stratified by CHADS2 score, 9.2 % (N=84) of patients were low-risk, 21.9 % (N=200) were moderate-risk, and 68.9 % (N=629) were high-risk. When stratified by CHA2DS2-VASc score, 4.2 % (N=38) of patients were low-risk, 11.0 % (N=100) were moderate-risk, and 84.1 % (N=775) were high-risk. Within the low-risk CHADS2 cohort, 45.2 % (N=38) maintained a score of 0, 47.6 % (N=40) increased to 1, and 7.1 % (N=6) increased to ≥2 when re-scored by CHA2DS2-VASc. Within the moderate-risk CHADS2 cohort, 30.5 %

($N=61$) maintained the same score and 69.5 % ($N=139$) increased to ≥ 2 when re-scored by CHA2DS2-VASc. In the low- and moderate-risk CHADS2 cohorts, the most common reason for receiving an increased score when re-scored by CHA2DS2-VASc was female gender (47.3 %), followed by similar proportions of vascular disease (25.8 %) and age 65–74 years (23.3 %), and a small proportion of patients aged ≥ 75 years (3.5 %).

CONCLUSIONS: In a safety net population of patients with AF there was a 55 % reduction in the number of patients for whom no treatment is recommended when scored using the CHA2DS2-VASc risk stratification tool. The most common reason for increased score was female gender. Increased numbers of patients indicated for anticoagulation represents an opportunity for shared decision-making between patients and providers. Increased utilization of anticoagulation should decrease incidence of thromboembolic stroke, but may increase risks of bleeding and costs associated with medication therapy and healthcare utilization. The ramifications of these potential issues on patients and the healthcare system are currently unknown.

IMPROVED PATIENT AND CAREGIVER HEALTH OUTCOMES ONE YEAR AFTER IMPLEMENTATION OF A DEMENTIA CARE MANAGEMENT PROGRAM Lee A. Jennings; Neil Wenger; Zaldy Tan; Heather McCreath; Katherine S. Serrano; Leslie C. Evertson; David B. Reuben. UCLA, Los Angeles, CA. (Tracking ID #2199481)

BACKGROUND: Caregiver strain, depressive symptoms, and low self-efficacy for managing dementia-related problems are common among those caring for patients with dementia and often poorly addressed in primary care. To better meet both patient and caregiver needs, in July 2012, UCLA launched the Alzheimer's and Dementia Care (ADC) Program, a quality improvement program that uses a co-management model with nurse practitioner Dementia Care Managers working with primary care physicians and community-based organizations to provide comprehensive dementia care.

METHODS: Design: Pre-post evaluation after 1-year of program enrollment Setting: Urban academic medical center Participants: Community-dwelling adults enrolled in a dementia care management program Measurements: Caregivers completed the Cornell Scale for Depression in Dementia and the Neuropsychiatric Inventory Questionnaire (NPI-Q) about the patient, and the Patient Health Questionnaire (PHQ-9) and Modified Caregiver Strain Index (MCSI) about themselves. Caregivers also completed a 9-item survey assessing caregiver self-efficacy for managing dementia-related problems and accessing help. Continuous variables were compared using paired *t*-test or Wilcoxon signed rank sum test for variables with non-normal distributions. Survey items were compared using McNemar's test.

RESULTS: One hundred eighty-two patient and caregiver dyads were seen for an annual follow-up visit, and 167 completed scales and surveys (55 % of program enrollees eligible for a 1-year follow-up visit). The mean patient age was 83 years, 63 % were female, and 63 % lived with the caregiver. Sixty-seven percent of caregivers were female and 91 % were spouses or children. One-year after program enrollment, more caregivers reported they had received advice about handling dementia-related problems (86 vs. 39 %); knew how to access community resources for care (57 vs. 17 %); felt confident dealing with the frustrations of caregiving (54 vs. 36 %); and felt they had a healthcare professional who helps them work through dementia care problems (72 vs. 27 %) ($p < 0.01$ for all comparisons). Patient cognitive and functional status declined during the one-year period consistent with expected rates for dementia. Despite progression of patients' dementia, caregivers reported fewer depressive symptoms for patients (Cornell) and for themselves (PHQ-9) and fewer dementia-related behavioral symptoms (NPI-Q severity score) and less caregiver distress related to these behaviors (NPI-Q distress score). (Table) Baseline caregiver strain, depressive symptoms, NPI-Q and FAQ scores, age, and gender did not differ between program enrollees who completed a one-year follow-up visit and those who did not. Enrollees who completed an annual follow-up visit had higher baseline MMSE scores (18.2 vs. 16.7, $p=0.01$).

CONCLUSIONS: One-year after enrollment in a dementia care management program, caregivers reported greater self-efficacy for managing dementia-related problems and accessing resources for care. Both patients and caregivers reported fewer depressive symptoms, and patients had fewer dementia-related behavioral symptoms despite progression of cognitive and functional impairment. Comprehensive care management for dementia using a co-management model can improve both patient and caregiver health outcomes.

UCLA Alzheimer's and Dementia Care Program Annual Outcomes, $N=182$

Caregiver Survey of Dementia Care and Self-Efficacy, selected items	Baseline N (%)	Year 1 N (%)
I have received advice about handling problems like the patient's memory loss, wandering or behavior problems.	43 (39 %)	94 (86 %)
I know how to get community services that will help me provide care.	19 (17 %)	62 (57 %)
I feel confident that I can deal with the frustrations of caregiving.	38 (36 %)	58 (54 %)
I have a healthcare professional who helps me work through dementia care problems.	28 (27 %)	74 (72 %)
Measure	M (SD)	M (SD)
Modified Caregiver Strain Index (MCSI), range 0–26	10.8 (6.1)	10.0 (6.1)
Caregiver Patient Health Questionnaire (PHQ-9), range 0–27	4.6 (4.9)	3.7 (4.1)
Neuropsychiatric Inventory Questionnaire (NPI-Q) severity score, range 0–36	10.5 (6.5)	9.3 (6.6)
Neuropsychiatric Inventory Questionnaire (NPI-Q) distress score, range 0–60	13.4 (9.6)	10.3 (8.3)
Cornell Depression Scale in Dementia, range 0–38	10.5 (6.1)	8.0 (5.9)
Mini Mental State Exam (MMSE), range 0–30	18.8 (6.0)	16.0 (6.7)
Functional Assessment Questionnaire (FAQ), range 0–30	18.1 (6.9)	21.5 (6.8)

$p < 0.05$ for all comparisons except MCSI ($p=0.11$).

For all scales a higher value indicates greater severity except for the MMSE.

IMPROVING DIABETES MANAGEMENT BY ENGAGING FAMILY SUPPORTERS IN THE PATIENT-CENTERED MEDICAL HOME: A PILOT INTERVENTION STUDY Ann-Marie Rosland^{2, 3}; Michele Heisler^{2, 3}; Ranak Trivedi^{1, 6}; Sofia Gaudioso²; Jessica Fennelly⁴; John D. Piette^{2, 5}. ¹VA Palo Alto, Palo Alto, CA; ²VA Ann Arbor, Ann Arbor, MI; ³University of Michigan Medical School, Ann Arbor, MI; ⁴University of Michigan College of Pharmacy, Ann Arbor, MI; ⁵University of Michigan School of Public Health, Ann Arbor, MI; ⁶Stanford University, Palo Alto, CA. (Tracking ID #2195938)

BACKGROUND: Patient-Centered Medical Homes (PCMH) aim to provide diabetes patients with comprehensive, team-based support for following complex care regimens. Success, however, hinges on patients' ability to be actively engaged in care. While professional staff deliver most patient engagement interventions, 50–75 % of adults with diabetes have a family member or friend (a "Care Partner") who regularly supports their diabetes management and could help them engage more effectively in care. This pilot study evaluated the feasibility and acceptability of an intervention to strengthen Care Partner capacity to help patients with high-risk diabetes engage in PCMH care and thereby improve their risk factor control.

METHODS: Participants were recruited from a VA PCMH registry of primary care diabetes patients at high risk for complications due to poor HbA1c or blood pressure (BP) control. Interested patients nominated a Care Partner. The 4-month intervention provided patient-Care Partner dyads with: one coaching session on health care engagement and evidence-based support skills; telephone coaching before patients' primary care visits; mailed after-visit summaries; weekly automated phone calls to prompt conversations about diabetes management; and tools to promote effective diabetes-related conversations. All components provided options for non-face-to-face Care Partner participation and could be delivered by PCMH team nurses. To assess feasibility and acceptability, we collected participant survey and medical record data at baseline and 4-month follow-up.

RESULTS: Nineteen patient-Care Partner dyads were recruited among 77 patients screened. Eighteen patients were men (mean age 66 years). Eleven Care Partners were co-habiting spouses. All 19 dyads completed the initial coaching session. Eighty-one percent of attempted pre-visit preparation calls and 82 % of attempted automated telephone assessments were completed. From baseline to follow-up the number of patients increased who reported that Care Partners helped them: track medications (29 to 63 %, $p=0.04$) and decide when to call their doctor/nurse with a diabetes-related problem (47 to 81 %, $p=0.04$). Care Partner self-efficacy in helping patients manage diabetes increased (8.0 to 8.6, $p=0.08$). The number of patients bringing home-glucose logs to most medical visits increased from 26 to 55 % ($p=0.07$), and patients' engagement in clinician interactions increased from 8.9 to 9.3 ($p=0.2$) on the Patient Engagement in Patient Physician Interactions scale. At follow-up, 95 % of patients and 89 % of Care Partners said they were satisfied with the program, and 84 % of both patients and Care Partners felt CO-IMPACT

helped them more effectively manage diabetes. Care Partner Caregiver Strain Index scores decreased (1.6 to 1.1, $p=0.17$). Patient and Care Partner-rated relationship quality did not change.

CONCLUSIONS: An intervention that guides high-risk diabetes patients and their Care Partners through evidence-based patient engagement and support strategies is desirable and feasible to participants, with indications that the intervention may increase Care Partner support for patient engagement and patient engagement itself, and decrease Care Partner stress. The impact of this intervention on patient engagement and diabetes management will be further evaluated in a recently funded trial that will randomize 200 dyads to a 12-month version of the intervention vs. PCMH usual care.

IMPROVING OPIOID PRESCRIBING IN THE CONTEXT OF ROUTINE PAIN SCREENING

Karleen Giannitrapani⁴; Sangeeta Ahluwalia³; Maura Pisciotto²; Risa Cromer⁶; Hannah C. Schreiber-Baum³; Steven Dobscha²; Erin E. Krebs¹; Karl Lorenz⁷. ¹Minneapolis VA Health Care System, Minneapolis, MN; ²Portland VAMC, Portland, OR; ³RAND Corporation, Encino, CA; ⁴UCLA / VA GLA, Los Angeles, CA; ⁵VA Greater Los Angeles Healthcare System, Los Angeles, CA; ⁶VA, Portland, OR; ⁷VA / UCLA/ RAND, Los Angeles, CA. (Tracking ID #2196337)

BACKGROUND: The Veteran Health Administration (VA) uses the 5th Vital Sign at each clinical encounter to assess pain using a 0–10 numeric rating scale (NRS). We asked primary care providers about their experiences with using the 5th vital sign and how it affects pain management.

METHODS: Members of primary care teams at two large academically-affiliated VA Medical Centers in two states including physicians, nurse practitioners, physician assistants, nurses, social workers, pharmacists, and support staff, participated in 9 interdisciplinary focus groups. The sites were diverse including both urban and rural primary care practices as well as both hospital and community based practices. Skilled focus group facilitators used a semi-structured interview guide to elucidate provider experiences with the 5th Vital Sign and managing pain. Qualitative analysts evaluated transcribed interviews using the method of constant comparison and produced mutually agreed upon themes.

RESULTS: Multidisciplinary primary care team members related the following themes: **Providers want to ensure high pain scores get addressed and may feel pressured to prescribe opioids** to minimize the risk of under-treating: “*You’re the bad guy if a guy comes in at ten pain and you send him out with aspirin.*” Providers also feel they lack other adequate pain management options: “*So a patient comes in and says my pain is ten out of ten. There’s some pressure on the provider about treating it. Probably with opioids because we have nothing else to offer.*” **Providers, however, prescribe with caution when their patients report high pain scores** because they believe some patients know how to game the system and quote patients as saying “*in order to get my narcotic, I have to say my pain is 10. Right? Then for sure my doctor will renew my narcotic.*” Providers also believe some patients are dishonest out of fear of losing access to opioids: “*there still is that underlying fear of being weaned.... so every time they are coming in, they are saying, ‘My pain is 10.’*” **Providers have ideas about what would help them better navigate pain management and opioid prescribing.** They want: 1) Data on function and activity not just experience of pain scores: “*what we should be focusing on...is how does the pain affect activity?*” 2) Non pharmacologic pain management approaches that provide effective alternatives to narcotics: “*If...rather than increasing narcotics or opiates it [an alternative approach] would give them options to help cope with their pain, it could help.*” 3) Coordinated multidisciplinary approaches to reducing opioid use: “*they [another clinic] used a multidisciplinary approach with lots of resources in a clinic with lots of different specialties and they were able to get I think every single patient... off of their medication.*”

CONCLUSIONS: Routine pain screening creates the expectation of better pain management among primary care providers and patients alike. Providers, however, are stymied by the numeric rating scale’s unidimensional nature as well as inadequate support for alternatives to pharmacologic management. To improve the outcomes of routine pain screening including minimizing inappropriate opioid use, primary care providers endorsed the use of simple measures that provide objective criteria (e.g. function) to support decision making, access to nonpharmacologic treatment, and integrated multidisciplinary approaches to pain management.

IMPROVING RACE/ETHNICITY DATA IN THE VETERANS HEALTH ADMINISTRATION Susan Hernandez¹; Philip W. Sylling². ¹VA, Seattle, WA; ²Veterans Health Administration, Seattle, WA. (Tracking ID #2198504)

BACKGROUND: The Department of Veteran Affairs (VA) implemented a new system for self-identified categories for race and ethnicity in 2003 that included five racial groups

(American Indian/Alaska Native, Asian, Black/African American, Native Hawaiian/Other Pacific Islander, White) and one ethnic group (Hispanic). We assessed agreement between self-reported race/ethnicity from patient satisfaction surveys and race/ethnicity data from earlier administrative data.

METHODS: The study included 8,874,659 primary care patients in the Primary Care Management Module (PCMM) and 2,004,759 completed an outpatient Survey of Healthcare Experiences of Patients (SHEP) during 2003–2013. We assessed agreement among self-reported race/ethnicity from SHEP, administrative data from the Corporate Data Warehouse (CDW), the main source of race/ethnicity data, and the Vitals Master files (extracted from Medicare files). We created the following categories for each data source: White, non-Hispanic; Black/African American, non-Hispanic; American Indian/Alaska Native (AI/AN), non-Hispanic; Asian non-Hispanic; Native Hawaiian/Other Pacific Islander (NH/PI), non-Hispanic; multiple races, non-Hispanic; other, non-Hispanic; and Hispanics. Hispanic Veterans could be of any race. Because the Vitals Statistic file lacked separate categories for Asian, Native Hawaiian, and Other Pacific Islanders we combined these categories. We also combined other and multi-race category in the SHEP for comparison with the other category in the vitals statistic file. Using SHEP data as the standard, we measured the agreement between the data sources by calculating sensitivity, specificity, positive (PPV) and negative predictive values (NPV), and Cohen’s kappa as a measure of agreement between the SHEP and administrative data. Kappa statistics of .81 represent excellent agreement.

RESULTS: The agreement between SHEP and CDW varied substantially by racial/ethnic group. PPV ranged from 96 % for whites to 13 % for multi-racial Veterans (White 96 %; Black 94 %; Hispanic 90 %; Asian 82.4 %; NH/PI 19.5 %; AI/AN 55.5 %; Multi-race 12.9). Kappa statistics ranged from .936 to .074 (White .833; Black .936; Hispanic .799; Asian .793; NH/PI .285; AI/AN .402; Multi-race .073). The agreement between self-reported SHEP and the Vitals statistic file also varied by racial/ethnic group. PPV ranged from 95 to 3.4 % (White 94.1 %; Black 93.2 %; Hispanic 95.1 %; Asian/NH/PI 77.6 %; AI/AN 59.6 %; Other/Multi-race 3.4 %). Kappa statistics ranged from .956 to .009 (White .735; Black .956; Hispanic .298; Asian/NH/PI .578; AI/AN .425; Other/Multi-race .009).

CONCLUSIONS: Overall, determination of race/ethnicity using the CDW data was relatively accurate (high PPV and kappa) for individuals who self-identified as white or black but less so for Hispanics and Asians and poor for NH/PI and AI/AN. Determination of race/ethnicity using the Vital Statistics file was also relatively accurate for individuals who self-identified as white or black but poor for Hispanics, Asian/NH/PI and AI/AN. However, the specificity (i.e., PPV) for being classified as Hispanic using Vital Statistics was high with low sensitivity. To correctly classify race and ethnicity for Veterans who use VA services, we suggest using SHEP data when available first, and then CDW data, and Vital statistic data only when necessary to adjust for missing data. Our next steps are to include race/ethnicity data from the inpatient SHEP and Department of Defense which are also self-reported data to construct a race/ethnicity variable to use for VA analyses.

IMPROVING RECOGNITION AND MANAGEMENT OF CHRONIC KIDNEY DISEASE IN PRIMARY CARE

Cara Litvin²; Steven M. Orstein¹; Madison Hyer¹. ¹Medical University of SC, Charleston, SC; ²Medical University of South Carolina, Charleston, SC. (Tracking ID #2198106)

BACKGROUND: Early detection and management of chronic kidney disease (CKD) can lead to interventions to prevent renal failure and reduce risk for cardiovascular disease. However, adherence to treatment goals is suboptimal in the primary care setting. The purpose of this study was to assess whether electronic health record (EHR)-based clinical decision support (CDS) tools can be used to improve the identification and management of CKD in primary care practices.

METHODS: This 2 year demonstration study from September 2012 to September 2014 was conducted in PPRNet, a national primary care practice-based research network whose members share a common EHR. Eleven practices in 11 states, representing 21 physicians and 11 midlevel providers, volunteered to participate. CKD CDS tools developed by the research team included a risk assessment tool that could be embedded within progress notes, EHR-based health maintenance protocols, an EHR flow chart and a patient registry generated from EHR data. To facilitate implementation of these tools, practices received quarterly CKD performance reports and hosted annual half day on-site visits for academic detailing, performance review and CDS training. CKD quality measures related to screening at-risk patients, monitoring, blood pressure management, lipid assessment, hemoglobin monitoring and avoidance of non-steroidal anti-inflammatory drugs (NSAIDs) were developed for this project using a consensus process among PPRNet providers. Linear mixed-effects regression models controlling for baseline values and number of eligible subjects were used to assess changes over time in each of these measures. Semi-structured group interviews were used to identify facilitators and barriers to CDS use.

RESULTS: There were statistically significant improvements in annual urine albumin screening for patients with diabetes or hypertension (estimated 24 month change 33.1 %, SE=0.0192, $p<0.001$) and annual urine albumin testing in patients with CKD (estimated 24 month change 21.6 %, SE=0.0312, $p<0.001$). No significant changes over time were seen in estimated glomerular filtration rate (eGFR) monitoring for patients with CKD, blood pressure monitoring, blood pressure control, lipid assessment, hemoglobin monitoring or avoidance of NSAIDs. Facilitators to CDS use included ease of use of the tools, practices' prioritization of improving CKD management, empowering staff to utilize standing orders based on EHR-based health maintenance protocols and use of the registry for patient outreach. Barriers included incorporating use into existing workflow, varied use among providers at the same practice, lack of awareness of functions by some providers and disagreement with some CDS recommendations.

CONCLUSIONS: Use of CDS tools to improve CKD identification and management in primary care practices shows promise, particularly for improving process measures such as urine albumin testing. However, other organizational, provider and patient factors must be addressed in order to effectively achieve improvements in CKD outcomes.

IMPROVING THE USE OF APPROPRIATE RADIOGRAPHS TO DIAGNOSE OSTEOARTHRITIS IN A PRIMARY CARE MEDICINE CLINIC Anielle A. Yang; Justin S. Yang; Kelly C. Cushing; Rick W. Wright; Michael A. Lane. Washington University, St. Louis, MO. (Tracking ID #2172624)

BACKGROUND: Weight bearing radiographs with Rosenberg views, the most sensitive and specific type of radiograph for detecting and assessing osteoarthritis of the knee, are underutilized by primary care physicians. Osteoarthritis severity detected radiographically can mean the difference between choices of conservative management versus assessment with magnetic resonance imaging once the patient is referred to a specialist. Improving the use of these appropriate radiographic views could improve clinical decision making while decreasing the need for repeat radiographs. The objective was to increase the utilization of appropriate radiographs through a quality improvement intervention involving physician education and changes in the electronic order entry process.

METHODS: This was a non-randomized, prospective, quality improvement study conducted at a primary care resident continuity clinic in a large academic hospital. The participants were one hundred thirty nine resident physicians. Two simultaneous interventions were implemented. The computerized provider order entry system was modified to streamline the order entry process for the appropriate radiographs and the residents

received education about appropriate imaging modalities and use of the modified order entry process. Outcomes were assessed in the 6 months pre- and post-intervention. The primary outcome was the proportion of radiographs ordered that included weight-bearing and Rosenberg views. Secondary outcomes included the number of repeat radiographs obtained for the purpose of weight-bearing or Rosenberg views, number of radiographs with merchant views, and severity of arthritis.

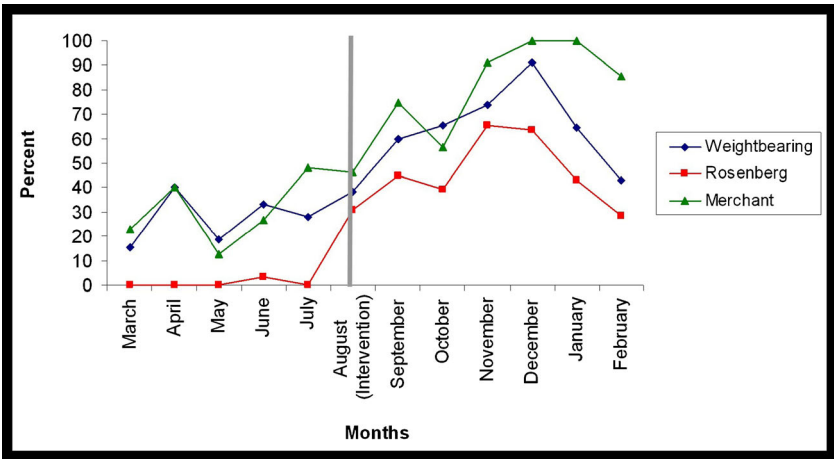
RESULTS: Between March 2013 and March 2014, 212 patients over the age of 40 received radiographs to evaluate for non-traumatic knee pain. Weight-bearing films increased from 28 % in the pre-implementation period to 66 % of the films in the post-implementation period ($p<0.001$). Rosenberg images were obtained in three patients (3 %) and 52 patients (49 %) during pre- and post-implementation periods ($p<0.001$), respectively. Repeat imaging decreased from 10 % in the pre-implementation period to 2 % in the post-implementation period ($p=0.009$). For the 13 patients that received repeat weight-bearing films, the severity of arthritis increased from 42 % joint space narrowing to 78 % joint space narrowing ($p<0.001$). The arthritic severity of all patients pre-implementation averaged 61 % joint space narrowing and post-implementation averaged 85 % joint space narrowing ($p=0.003$).

CONCLUSIONS: A low cost, quality improvement intervention can increase the use of appropriate imaging for patients with non-traumatic knee pain, reduce healthcare utilization by decreasing repeat imaging, and allow for a more accurate assessment of osteoarthritis severity leading to better clinical decision making.

Primary and Secondary Outcomes Pre- and Post-implementation

Imaging Type	Pre-implementation (N=105)	Post-implementation (N=107)	P-value
Weightbearing	28 % (29)	66 % (71)	<0.001
Bilateral	65 % (68)	77 % (82)	0.08
Merchant	31 % (33)	82 % (88)	<0.001
Rosenberg	3 % (3)	49 % (52)	<0.001
Repeat	10 % (11)	2 % (2)	0.009

When comparing the 6 months pre-implementation with the 6 months post-implementation, there was a statistically significant increase in the weightbearing, Rosenberg, and Merchant films ordered. There was also a statistically significant decrease in the number of repeat films that were ordered for the purpose of obtaining weightbearing or Rosenberg views.



Before the start of the intervention less than 40 % of the knee films ordered included weightbearing or Merchant views and less than 5 % included Rosenberg views. After the start of the intervention in August, there was an increase in all types of appropriate knee films that were ordered which continued through early November when the intervention ended and peaked in December. Starting in January there was a decrease in the use of appropriate films which was greater for weightbearing and Rosenberg films than for Merchant films. All three views of the knee, however, were still ordered at higher rates than before the initiation of the intervention.

INAPPROPRIATE OVERRIDES OF AGE-RELATED ALERTS IN PRESCRIBER ORDER ENTRY Olivia Dalleur^{1, 4}; Diane L. Seger^{3, 1}; Sarah P. Slight^{2, 1}; Mary Amato^{1, 5}; Tewodros Eguale^{1, 6}; Karen C. Nanji^{3, 7}; Michael Swerdloff^{3, 1}; Patricia C. Dykes^{1, 8}; Julie Fiskio^{3, 1}; David W. Bates^{1, 8, 1}Brigham and Women's Hospital, Boston, MA; ²Durham University, Stockton on Tees, United Kingdom; ³Partners Healthcare System, Wellesley, MA; ⁴Universite catholique de Louvain (UCL), Brussels, Belgium; ⁵MCPHS University, Boston, MA; ⁶Department of Medicine, McGill University, Montreal, QC, Canada; ⁷Department of Anesthesia, Critical Care and Pain Medicine,

Massachusetts General Hospital, Boston, MA; ⁸Harvard Medical School, Boston, MA. (Tracking ID #2197513)

BACKGROUND: To prevent adverse drug events from occurring in older patients, Clinical Decision Support (CDS) can suggest alternatives to drugs with an unfavourable risk/benefit ratio. In our institution, a large academic hospital in Boston, suggestions about alternatives are currently displayed as an alert in the prescriber order entry system. However, we observe that the providers overrode a large proportion of these suggestions. This study evaluated the appropriateness of these overrides.

METHODS: All alerts displayed between 2009 and 2011 were collected. We developed a set of criteria for which the overrides could be considered potentially appropriate. For example, these criteria took into account previous well-tolerated use of the same drug and the dosage used. Some drugs were considered as always inappropriate if prescribed to older patients, regardless the context (e.g. diazepam). Using this set of criteria, we measured the proportion of cases in which overriding the suggestions could be considered potentially appropriate. Two independent reviewers assessed a subsample of 208 overrides that were randomly extracted from prescribers who had a higher level of overrides and was checked for representativeness. Cases in which overriding the alert was recurrently appropriate were targeted for changes in the CDS.

RESULTS: Over 3 years, 33 141 recommendations were overridden, exposing 12 833 patients to potentially inappropriate medications. Half of these overrides were laxatives. As these were mainly prescribed for short-term treatment and bisacodyl was no longer on the latest version of the American Geriatrics Society Beers list of inappropriate drugs in elderly, all laxatives were considered as appropriate and excluded from the appropriateness analysis of the subsample. In the subsample, the reviewers classified 74 % of the overrides as inappropriate. Forty percent overrides were drugs that are always inappropriate in older patients. Other inappropriate prescribing involved drug-disease contraindications ($n=4$, anti-inflammatory drugs), side effects ($n=26$, mainly antidepressants) or inappropriate doses ($n=55$, mainly analgesics and benzodiazepines). Following this study, the alerts that were appropriately overridden were communicated to the informatics department managing the alerts as well as to the responsible committees. In addition, we organised academic detailing sessions with providers, the purpose of which was to understand the reasons behind their override decisions and to give them information about appropriate use of drugs in older patients.

CONCLUSIONS: A single improvement in the CDS—deleting alerts about laxatives—could cut the number of alerts received by providers by about half. Among the remaining alerts, although most of them were indeed inappropriate, 26 % could be considered as potentially appropriate, meaning that regular reassessment of the CDS in context of daily prescribing decisions is required to keep it relevant and reduce possible alert fatigue. Further evaluation will assess if reassessment and refinement of the alerts and the academic detailing can help decrease the override rates and improve the quality of prescribing.

INCIDENCE OF SEROTONIN SYNDROME WITH CONCOMITANT USE OF SEROTONERGIC AGENTS IN THE U.S. CLINICAL PRACTICE Zhixiao Wang¹; Lin Xie²; Stephanie Alley^{3, 4}; Onur Baser^{2, 5}; Charles Nguyen^{3, 6}. ¹Eisai, Inc, Woodcliff

Lake, NJ; ²STATinMED Research, Ann Arbor, MI; ³Long Beach VA Healthcare System, Long Beach, CA; ⁴Southern California Institute of Research, Long Beach, CA; ⁵The University of Michigan, Ann Arbor, MI; ⁶University of California Irvine School of Medicine, Irvine, CA. (Tracking ID #2198446)

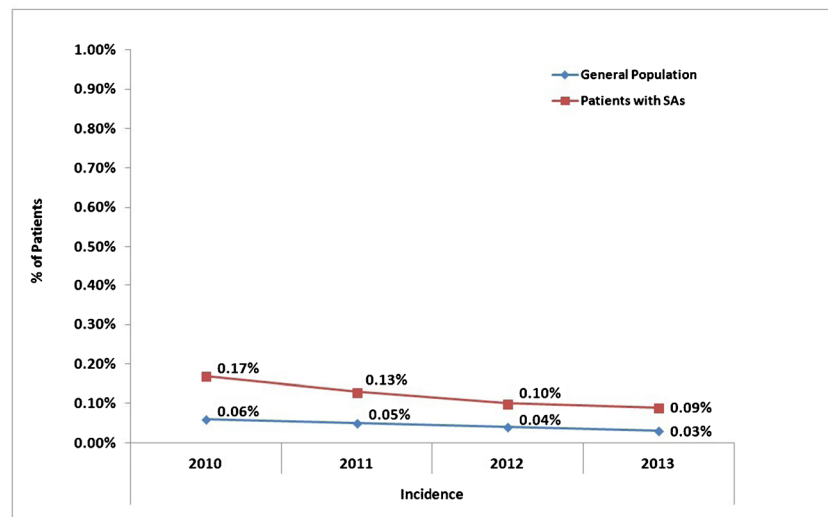
BACKGROUND: Serotonin syndrome (SS) is an adverse drug reaction resulting from increased serotonin levels stimulating central and peripheral postsynaptic serotonin receptors, particularly serotonin 5-HT_{2A} receptors.¹ SS may occur in patients receiving monotherapy or combinations of serotonergic agents (SAs). Although combination of SAs is common in clinical practice, the incidence and prevalence of SS is still largely unknown. This study examined the prevalence and incidence of SS over time with concomitant use of SAs in the U.S. commercially insured population.

METHODS: Adult patients prescribed SAs were identified using the IMS PharMetrics PlusTM dataset from 01JAN2010-31DEC2013. IMS data has more than 150 million unique patients' enrollment, demographic, medical and pharmacy claims. Patients with continuous medical and pharmacy benefits for 12 months prior to the index date, defined as the first SA prescription claim date, were included and evaluated until death, disenrollment or the end of follow up. Patients were assigned to cohorts based on drug exposure: single monoamine oxidase inhibitor (MAOI) drug, MAOI drugs in combination with other SAs, single non-MAOI SA, and multiple non-MAOI SAs (2, 3, 4 and 5 or more SAs). An SS event was identified using International Classifications of Diseases, 9th Revision Clinical Modification code: 333.99. A patient may have more than one SS event during the study period and be included in multiple cohorts, depending on drug exposure patterns. Annual prevalence was calculated as the percentage of continuously enrolled patients with at least one SS claim. Annual incidence was calculated as the percentage of SS patients among enrollees with no prior SS diagnosis. Poisson regression was used to assess SS incidence trends, and adjusted incidence relative risks (IRRs) were estimated.

RESULTS: A total of 11,818,956 patients were identified and seven drug cohorts were created. The overall incidence rate in the commercially insured population decreased from 0.17 % in 2010 to 0.09 % in 2013. The highest incidence rate was observed in two cohorts: 1) patients who were prescribed MAOIs in combination with non-MAOI SAs (10.25 per 1000 person-years) and 2) patients prescribed five or more non-MAOI SAs (10.50 per 1000 person-years). The lowest incidence of SS occurred among patients prescribed a single, non-MAOI SA (1.38 per 1000 person-years). Compared to those prescribed with one non-MAOI SA, the IRR of SS was 5.49 (95 % confidence interval [CI]: 4.33–6.97) times higher among patients prescribed a MAOI in combination with non-MAOI SAs, and 5.77 (95 % CI: 5.30–6.28) times higher for those prescribed five or more non-MAOI SAs. Overall SS prevalence decreased during the 4-year study period.

CONCLUSIONS: Although the analysis indicated the relative risk of SS increased as more SAs were taken concomitantly, the overall incidence and prevalence of SS in the commercially insured population in the US were very low. This data provides physicians with additional information about SS associated with prescribing SAs. ¹Evans RW, Tepper SJ, Shapiro RE, et al. The FDA Alert on serotonin syndrome with use of triptans combined with selective serotonin reuptake inhibitors or selective serotonin-norepinephrine reuptake inhibitors: American Headache Society position paper. *Headache*. 2010;50(6):1089–99.

Figure 1. Serotonin Syndrome Incidence in U.S. Clinical Setting (2010-2013)



SA: serotonergic agents

Table 1. Serotonin Syndrome Event Rate for Patients prescribed Different Combinations of Serotonergic Agents

Cohorts	Serotonin Syndrome Event Rate per 1000 person-years	Unadjusted IRR	Adjusted IRR			
			IRR	95% CI	p-value	
One Non-MAOI Drug	1.38	1.00	Reference			
One MAOI Drug	2.97	2.16	1.63	1.13	2.34	0.0087
MAOI Combination	10.25	7.44	5.49	4.33	6.97	<0.0001
Two-drug Combination	3.37	2.45	2.20	2.15	2.25	<0.0001
Three-drug Combination	4.60	3.34	2.91	2.81	3.00	<0.0001
Four-drug Combination	6.32	4.59	3.84	3.64	4.05	<0.0001
Five or More-drug Combination	10.50	7.63	5.77	5.30	6.28	<0.0001

MAOI: monoamine oxidase inhibitor

IRR: incidence relative risk

CI: confidence interval

INCORPORATING COMMUNITY HEALTH WORKERS INTO THE VA: WHAT DO VETERANS THINK? Julie B. Silverman²; Karin M. Nelson¹; James Krieger³. ¹University of Washington, VA Puget Sound, Seattle, WA; ²VA Puget Sound, Seattle, WA; ³Public Health—Seattle King County, Seattle, WA. (Tracking ID #2191031)

BACKGROUND: Community health workers (CHWs) are lay members who work with their communities to improve access to healthcare and social services, support adoption of healthy behaviors and improve overall health and wellbeing. While use of CHWs in the U.S. is limited, the shift toward bundled payments and the growing focus on patient-centered medical homes has increased their use. Though CHW utilization within the Department of Veterans Affairs (VA) is rare, a VA-funded systematic review of healthcare disparities recommended integration of CHWs into VA settings as a promising intervention. We conducted a qualitative study to evaluate Veterans' experiences working with a CHW and assess the acceptability of CHW utilization within the VA.

METHODS: We conducted 14 semi-structured phone interviews with Veterans who had received a CHW intervention as part of a larger randomized controlled trial, Peer Support for Achieving Independence in Diabetes (Peer AID), which tested the effectiveness of a home-visit diabetes self-management support program. Peer AID participants had poorly controlled type 2 diabetes (A1c $\geq 8.0\%$), household income $<250\%$ of the federal poverty level and were 30–70 years old. The CHWs were non-Veterans and paid employees of Public Health—Seattle & King County. Phone interviews occurred after completion of study. The recorded interviews were transcribed and analyzed using inductive content analysis.

RESULTS: Veterans reported high satisfaction with the CHW intervention. Veterans appreciated the convenience of CHW making home visits, which allowed Veterans to receive diabetes self-management support without the expense and stress of traveling to the VA. They also valued the one-to-one attention and the amount of time the CHW spent with them. None of the Veterans were bothered by the non-Veteran status of the CHWs, noting that the CHWs' knowledge and training were more important than their background or Veteran status. However, several participants mentioned that having a Veteran CHW, who has a shared military background and firsthand knowledge of the VA system, could be valuable. Participants supported the idea of incorporating CHWs into the VA system.

CONCLUSIONS: Veterans had overwhelming positive experiences working with a CHW and encouraged the use of CHWs within the VA. The services provided by CHWs are well aligned with the VA's redesigned primary care model, the Patient Aligned Care Team (PACT), which emphasizes comprehensive, patient-centered, team-based care that improves access and connects Veterans to appropriate services within the VA and the communities in which they live.

INCREASED EMPATHY AS A LONG-TERM EFFECT OF A RESIDENCY WRITERS' WORKSHOP Megan S. Lemay; Anna Reisman; John Encandela; Lisa Sanders. Yale School of Medicine, New Haven, CT. (Tracking ID #2196495)

BACKGROUND: Creative writing workshops in medical training generally aim to facilitate reflection, increase empathy, and teach trainees to understand the importance of a patient's story. Over the past 11 years, 130 residents from multiple specialties have participated in the annual Yale Internal Medicine Writer's Workshop. Participants submit a narrative and then participate in an intensive two-day workshop focused on the art and

craft of writing. After the workshop, participants work on revisions with continued feedback, leading to a publication of the narratives, a public reading, and an invited grand rounds featuring a physician-writer. We hypothesized that the workshop has long-term effects on empathy, observation, and motivation to write.

METHODS: An online anonymous survey was sent to the 130 previous participants of the Yale Internal Medicine Writer's Workshop. Participants were asked to evaluate (via a 5-point Likert scale and qualitative text response) how the workshop influenced their empathy, observation skills, writing skills, and whether they were inspired to continue to write. Qualitative responses were coded by study investigators (independent coding followed by consensus) to identify themes in resident responses.

RESULTS: Ninety (69 %) former resident participants responded to the survey. The majority of residents agreed or strongly agreed that the workshop influenced their ability for careful observation (84 %), ability to be empathic (66 %), improved their writing (89 %), and inspired them to keep writing informally (such as keeping a journal) (53 %) and formally (for publication) (67 %). Respondents indicated that the workshop influenced their empathy with patients as well as colleagues. Some noted that the workshop helped them to become more empathic through recognizing that each patient has a story. One respondent noted: "By describing my patients' experiences in writing, I have increased the strength of my empathic self."

CONCLUSIONS: Residents who participated in this writing workshop described a sustained increase in their ability to be empathic with both patients and other physicians as a result of this participation. The writing workshop also taught them to observe more carefully and improved self-reported writing skills. Many former workshop participants have continued narrative writing, both formally and informally. Residency writing workshops focused on the craft of narrative writing may help to preserve and enhance empathy.

INCREASING END-OF-LIFE CARE DISCUSSIONS, INCLUDING CODE STATUS, IN A RESIDENT RUN URBAN COMMUNITY PRIMARY CARE CLINIC Andrew Ip; Rekha Thammana; Nurcan Ilksoy. Emory University, Atlanta, GA. (Tracking ID #2199949)

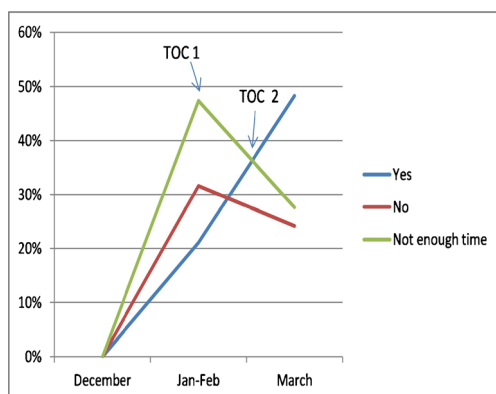
BACKGROUND: Many elderly patients (defined as >65 years of age) do not have advanced directives on file to address their end-of-life care. An advanced directive is an important document that respects patient wishes, guides patient care especially in regards to code status, and can save our health care system money. A large amount of Medicare billing, up to one-quarter in some studies, is for the last year of life, and only 20–30 % of the U.S. population have an advanced directive. Our resident-run clinic wished to address palliative care in our urban community in the outpatient setting, however we realized filling an advanced directive was difficult in our current system. We therefore wanted to address discussions of code-status as a starting point. Our objective is to investigate if palliative care discussions can be held during primary clinic visits. In our quality improvement study, we aim to increase the number of end-of-life care discussions, primarily code status documentations, in our urban hospital clinic patients older than 65 years.

METHODS: We aimed to study the elderly population in our urban community clinic. We used an age cut-off of 65 years to discuss code status. Resident providers were asked to implement two tests of change. The first test of change, performed in January-February of 2014 was an implementation of a computer phrase, or dot-phrase, that can be inserted into a note template for each outpatient encounter. The providers did have to copy this dot phrase into their templates in order for it to auto-populate with each new patient encounter.

The dot phrase had 2 prompts: “Is this patient over 65 years of age?” followed by a Yes or No. “Were you able to discuss code status in this outpatient visit?” followed by a Yes or No or Not Enough Time. The second test of change occurred during March of 2014, and incorporated clinic assistants handing out surveys to each patient over the age of 65 at the time of check-in. The survey had two simple questions, “Do you know what a code status is?” and “Would you be interested in discussing this today?”.

RESULTS: In the first test of change during the months of January and February, 21 % (8/38) of patients participated in code status discussions, while 32 % (12/38) of patients declined participating, and 47 % (18/38) of patients were unable to participate due to resident providers not having enough time to address code status. In our second test of change during the month of March, 48 % (14/29) of patients participated in code status discussions, while 24 % (7/29) declined participating, and 28 % (8/29) were unable to participate due to resident providers not having enough time in their clinic to address code status.

CONCLUSIONS: This study addressed how palliative care discussions can be incorporated into a busy urban community primary care clinic. Our first test of change showed that a simple dot phrase can remind providers to initiate a palliative discussion about code status, however this occurred only 20 % of the time. Our second test of change showed that a simple survey can prompt patients to bring up the topic with providers, and increased the percentage to almost 50 %. There were several barriers for our study. Our resident providers often had too little time to initiate a discussion about code status or often forgot to implement our first test of the change, the dot phrase. This was due to our patient population having multiple comorbidities as well as having a large agenda to discuss each visit. Another barrier was the lack of a standard approach to initiate a code status discussion in the outpatient setting as resident providers each had different methods on how to approach the topic with their patients.



INDIVIDUAL PCP REFERRAL BEHAVIOR FOLLOWING INTRODUCTION OF A STRUCTURED REFERRAL AND ECONSULT PROGRAM Priya A. Prasad²; Nathaniel Gleason¹; Carlin H. Senter³; Maria E. Otto²; Ariana Afshar¹; Ralph Gonzales². ¹UC San Francisco, Nathaniel Gleason, CA; ²UCSF, San Francisco, CA; ³University of California San Francisco, San Francisco, CA. (Tracking ID #2200136)

BACKGROUND: We implemented two interventions to improve access to specialty care at an academic medical center (AMC) in 2012: Structured Referrals, which provide decision-support on referral appropriateness, and eConsults, which allow the PCP to access input from a specialist, via the electronic health record (EHR), without referring the patient for in-person evaluation. We demonstrated and reported a decrease in the aggregate referral rate (referrals from across all participating primary care practices per 100 primary care visits) of 16 %. Here we analyze the impact on individual PCP referral behavior including analysis of the main General Internal Medicine practice, which is the administrative home of the above interventions, versus participating primary care practices at other locations.

METHODS: A multi-site AMC, UC San Francisco has 7 primary care practices offering care for adult patients. Approximately 100 general interests, including residents and fellows, occupy a central practice (GIM). Providers at the other 6 primary care practices include general interests, family and community medicine physicians, geriatricians, and nurse practitioners (non-GIM). PCPs in all 7 clinics employ Structured Referrals, implemented in 5/12, which include guidance on pre-referral evaluation and conservative

management. An eConsult option providing non-face-to-face evaluation by a specialist was launched in 9/2012 in all PCP practices. Related activities that took place at the GIM practice included interaction with the implementation team, who elicited feedback about referral guidelines from PCPs, and case conferences with guest subspecialists to discuss referrals and care coordination. To ensure a sample of active clinicians, PCPs who performed less than 200 visits during either the baseline and intervention periods were excluded ($n=60$ included PCPs). We compared the provider-level referral order rate (ROR) per 100 primary care office visits during the baseline period (9/11-4/12) and a seasonally matched intervention period (9/13-4/14). Referrals to all medicine subspecialty practices ($n=11$ specialties), ordered by included PCPs were analyzed. A difference score was calculated to illustrate changes in provider-level ROR between baseline and intervention periods. The mean change was compared between providers from General Internal Medicine (GIM) ($n=33$) and non-GIM ($n=27$) using a t-test. All analyses were conducted using Stata 13.

RESULTS: A decrease in the provider-level ROR among all providers, between the baseline and intervention periods, was not statistically significant (mean change in ROR, -0.68 , 95 % CI -1.9 to 0.5). Providers in the GIM clinic decreased mean ROR from 13.7 to 10.9 referral orders per 100 primary care visits, a statistically significant decrease of 20 % (mean change -2.79 , 95 % CI -4.31 to -1.27), while providers not in the GIM clinic increased mean ROR from 10.5 to 12.3 referral orders (mean change 1.9 , 95 % CI 0.44 to 3.33). There was a significant difference in the mean ROR change score when comparing providers in GIM to non-GIM (-2.8 v. 1.9 , $p<0.0001$).

CONCLUSIONS: A Structured Referral and eConsult intervention lead to a, previously reported, aggregate decrease in referrals from primary care to medicine subspecialties, but examining the mean change in individual provider referral order rate does not show a decrease overall. Instead, GIM providers located at a large, central practice significantly decreased individual ROR, while providers outside this practice increased their mean rate of referral. The finding does not appear to be a difference in referral rate by primary care specialty, i.e. between GIM providers versus FCM providers, but rather a function of location. A number of related activities took place at the GIM practice, suggesting the importance of these co-interventions. The finding has implications for the implementation of a care-delivery innovation, supporting the need to maximize familiarity with the project as well as interaction with the project team.

INDIVIDUAL VERSUS TEAM-BASED FINANCIAL INCENTIVES FOR PHYSICAL ACTIVITY—A RANDOMIZED, CONTROLLED TRIAL Mitesh Patel^{1, 2}; David A. Asch^{1, 2}; Roy Rosin¹; Dylan Small¹; Scarlett Bellamy¹; Nancy Hafl³; Samantha Lee¹; Lisa Wesby¹; Karen Hoffer¹; David Shuttleworth¹; Devon Taylor¹; Victoria Ulrich¹; Jingsan Zhu¹; Lin Yang¹; Xingmei Wang¹; Kevin G. Volpp^{1, 2}. ¹University of Pennsylvania, Philadelphia, PA; ²Philadelphia VA Medical Center, Philadelphia, PA; ³Massachusetts General Hospital, Boston, MA. (Tracking ID #2196516)

BACKGROUND: More than half of adults in the United States do not achieve the minimum recommended level of physical activity to achieve health benefits. While pedometers offer promise in encouraging more activity, their adoption is limited and the optimal way to motivate individuals or teams is unknown. More than two-thirds of adults in the United States possess a smartphone and carry it with them often. Insights from behavioral economics may offer new strategies to leverage smartphones to impact population health through the use of financial incentives. The objective of this study was to use a connected health approach with smartphones tracking step counts to compare the effectiveness of individual versus team-based financial incentives for physical activity.

METHODS: Three hundred four adult employees from a large corporation in Philadelphia formed 76 four-member teams randomized to control or one of 3 intervention arms: individual incentives, team incentives, or combined incentives (based on individual and team performance)—with reward eligibility based on achieving at least 7000 steps per day, a level endorsed by the American College of Sports Medicine as meeting federal guidelines for the minimum level of physical activity to achieve health benefits. Financial incentives were offered in the form of a \$50 drawing held every other day and had an expected economic value of \$1.40 per day. The intervention period lasted 13 weeks and participants were followed for an additional 13 weeks. Step counts were tracked by smartphone accelerometers using an application that ran passively in the background. The primary outcome measure was the proportion of participant-days that the goal was achieved during the intervention. The intent-to-treat analysis used generalized linear and mixed-models to adjust for the repeated measures of participant step counts and clustering by team. All hypothesis tests were two-sided. To maintain the type I error rate while testing 6 pairwise comparisons, we used a Bonferroni correction to define an alpha of 0.0083 as our threshold for statistical significance. We estimated that a sample of at least 280 participants would ensure 80 % power to detect a 20 % difference between arms.

RESULTS: Participants in the study sample had a mean body mass index of 29.2 (standard deviation [SD]: 6.4), mean age of 40.5 (SD 10.4), and were 77.3 % female. Compared to control during the intervention period, the proportion achieving the 7000 step goal was significantly greater for the combined incentive (0.35 vs. 0.18, Difference: 0.17, 95 % confidence interval [CI]: 0.07–0.28, $P < 0.001$) but not for the individual incentive (0.25 vs 0.18, Difference: 0.08, 95 % CI: –0.02–0.18, $P=0.13$) or the team incentive (0.17 vs 0.18, Difference: –0.003, 95 % CI: –0.11–0.10, $P=.96$). The combined incentive was significantly greater than the team incentive (0.35 vs. 0.17, Difference: 0.18, 95 % CI: 0.08–0.28, $P < 0.001$) but not the individual incentive (0.35 vs. 0.25, Difference: 0.10, 95 % CI: –0.001–0.19, $P=0.05$). Only the combined incentive had greater daily steps than control (Difference: 1446, 95 % CI: 448–2444, $P=0.005$). There were no significant differences between arms during the follow-up period.

CONCLUSIONS: Compared to control, a combination of individual and team incentives nearly doubled the proportion of days that individuals achieved physical activity goals. Incentives based on the performance of the individual alone or the entire team were not effective.

INITIATION OF CIGARETTE SMOKING AFTER ELECTRONIC CIGARETTE USE: A NATIONAL STUDY OF YOUNG ADULTS Brian A. Primack¹; Samir Soneji²; Michael Stoolmiller³; Michael J. Fine²; Jim Sargent³. ¹University of Pittsburgh, Pittsburgh, PA; ²VA Pittsburgh Healthcare System, Pittsburgh, PA; ³Dartmouth University School of Medicine, Hanover, NH; ⁴Oregon Social Learning Center, Eugene, OR. (Tracking ID #2198326)

BACKGROUND: An electronic cigarette (e-cigarette) contains a heating element that atomizes nicotine-containing liquid into an inhalable vapor. Compared with regular cigarettes, e-cigarettes seem to be lower in toxicants and associated adverse events, making them potentially valuable tools for smoking cessation. However, e-cigarette use is substantially increasing among young adults who are not users of traditional cigarettes. This large group of individuals may be at risk for sensitization to nicotine and transition to later cigarette smoking, which would have profound negative public health implications. While cross-sectional studies suggest that use of e-cigarettes is associated with intention to use regular cigarettes in the future and being open to future cigarette smoking, these important associations have not been studied longitudinally. Therefore, we conducted a longitudinal study among non-cigarette-smoking young adults to determine associations between baseline e-cigarette use and initiation of regular cigarette smoking 1 year later.

METHODS: We studied 607 non-cigarette-smoking individuals ages 16–26 years who had complete longitudinal data from two study waves collected in 2012–2014. These participants had been recruited as part of a larger nationally-representative US study that recruited via a random-digit dial telephone survey using landline and cell phone frames. At baseline for the current study, 874 non-smoking individuals had complete data, and our response rate was 69 % ($N=607$) for 1-year follow-up data. Our primary dependent variable was initiation of smoking between baseline and follow-up, and our primary independent variable was whether a participant had used e-cigarettes at baseline. We used logistic regression with sample weights to assess bivariable and multivariable associations between baseline e-cigarette use and initiation of regular cigarette smoking while controlling for multiple relevant sociodemographic, personal, and environmental variables.

RESULTS: Our sample of 607 individuals was 57 % female, 77 % Caucasian and non-Hispanic, 6 % African-American and non-Hispanic, 8 % Hispanic, and 10 % of mixed or other race. Only 9 (1.5 %) baseline participants was an e-cigarette user. Overall, 77 (12.7 %) baseline participants initiated cigarette smoking at follow-up, including 4 (44.4 %) among the baseline e-cigarette users and 73 (12.2 %) among e-cigarette non-users. In a multivariable model that included all measured relevant covariates—age, sex, race/ethnicity, maternal education, household income, sensation seeking, parental smoking, and peer smoking—baseline e-cigarette use was significantly associated with cigarette smoking initiation (AOR=4.1, $P=.028$). The other significant predictors were African-American race (AOR=2.6, $P=.041$), sensation seeking (AOR=1.86, $P=.026$) and peer smoking (AOR=1.78, $P=.001$).

CONCLUSIONS: Baseline e-cigarette smokers had substantially greater odds (about 4 times as high) of subsequently initiating cigarette smoking. This odds ratio accounted not only for socio-demographic variables but also for important covariates such as sensation seeking tendencies and peer and parental smoking. These findings highlight the concern that the thousands of adolescents and young adults who were previously tobacco-free but are now initiating e-cigarette smoking may be at substantial risk for transition to regular cigarettes. While our study was limited by relatively low power due to the small number of e-cigarette only users at baseline, it is noteworthy that results were still significant and robust in an appropriate multivariable model. In conclusion, it is an important irony that a product which is marketed as a harm reduction tool for established cigarette smokers may in fact also become an important contributor to the development of a new population of cigarette smokers.

INSULIN PRESCRIBING BY PROVIDER TYPE IN AN URBAN ACADEMIC MEDICAL CENTER Alex R. Montero²; Michelle Z. Flynn¹; Tyler Kingdon³; David An³; Jennifer Zallen³; Kerry S. Gray²; Malek Cheikh⁵; Michelle F. Magee⁴. ¹Georgetown University, Washington, DC; ²Georgetown University Hospital, Washington, DC; ³Georgetown University School of Medicine, Washington, DC; ⁴MedStar Diabetes Institute, Washington, DC; ⁵MedStar Union Memorial Hospital, Baltimore, MD. (Tracking ID #2199591)

BACKGROUND: Poor glycemic control has been linked with adverse patient outcomes in hospitalized patients. Randomized inpatient data support the use of scheduled (basal-bolus) insulin over sliding scale insulin (SSI) only regimens and national guidelines (SHM, ADA and AACE) recommend that this approach be used, along with avoidance of use of oral agents. The association between the admitting service type and adherence to these guidelines has not been characterized. Our aim was to examine to what degree trainees' inpatient insulin prescribing practices adhere to these guidelines by specialty type.

METHODS: This was a prospective cohort study. During a 6 week period (February to March 2014), the electronic charts of all consecutive adult patients (age > 18) admitted to MedStar Georgetown University Hospital non-critical care units with a documented diagnosis of diabetes mellitus (provider report or taking DM medications prior to admission) were examined. The main independent variable was admitting provider type (Medicine or Surgery service). Covariates consisted of demographics, insurance status, and Charlson Comorbidity Index (CCI). The primary outcome variable was the initial glycemic control regimen for which univariate analyses were carried out utilizing the Chi Square test; multivariable analyses utilized logistic regression. Secondary outcomes included glycemic control, with hyperglycemia defined as the proportion of patient-days with at least one FSG > 180 mg/dL; and hypoglycemia as the proportion of patient days with at least one FSG < 70.

RESULTS: Initial glycemic control regimens did not differ by admitting provider type ($p=.09$). The SSI only regimen was the most prevalent type of glycemic control regimen prescribed (48 %) compared to scheduled insulin (38 %). Few patients (0–4.3 %) were prescribed oral agents alone. Among scheduled insulin prescriptions, the majority were for long-acting basal insulin (78.72 %) and SSI (98.94 %). Both hyperglycemia ($p=.001$) and hypoglycemia ($p=.04$) were more common in patients prescribed scheduled insulin compared to SSI only. Multivariable models controlling for demographics and comorbidity did not significantly change these results.

CONCLUSIONS: Initial prescriptions of insulin was similar among house staff in Surgery and Medicine. Consistent with recommendations from national organizations, few patients were prescribed oral agents alone. Trainees on both services, however, use SSI alone commonly despite guidelines discouraging this practice. Counterintuitively, and in contrast to other reports in the literature, glycemic outcomes with scheduled insulin were worse when compared to SSI only. The major limitation is the possibility of residual confounding by relevant unmeasured factors such as severity of diabetes. Lack of familiarity with appropriate dosing of scheduled insulin containing regimens may explain this finding and suggests that housestaff education is needed. Alternatively, patients prescribed SSI only may have easier to control DM independent of the inpatient regimen prescribed to them.

Patient Characteristics

Age	62.6
Female	133 (51%)
Race/Ethnicity	
-White	93 (35.9%)
-African American	134 (51.7%)
-Asian American	Asian 4 (1.5%)
-Unknown	Unknown 27 (10.42%)
Insurance	
-Any Private	Any Private 180 (69.5%)
-Any Medicaid	Any Medicaid 17 (6.6%)
-Medicare Only	Medicare Only 60 (23.2%)
-Self Pay	Self Pay 2(0.8)
Charlson Index	2.27
Baseline CR	1.93
Admitting Service	
-Medicine	144 (55.38)
-Surgery	116 (44.62)
LOS (days)	7.35

Primary Analysis: Initial Glycemic Regimen by Provider Type ($p=.09$)

	Initial Glycemic Regimen (n=260)				
	No Meds	Only Oral Meds	Only SSI	Non-SSI Insulin	Total
Medicine	19 (13.2)	0	71 (49.3)	54 (37.5)	144
Surgery	16 (13.8)	5 (4.3)	55 (47.4)	40 (34.5)	116

INSURANCE TURNOVER, CARE FRAGMENTATION AND EMERGENCY DEPARTMENT UTILIZATION IN MASSACHUSETTS, 2011–2012 Michael Bamett^{1, 3}; Zirui Song^{2, 3}; Sherri Rose³; Asaf Bitton^{1, 3}; Michael E. Chernew³; Bruce E. Landon^{3, 4}. ¹Brigham and Women's Hospital, Brookline, MA; ²Massachusetts General Hospital, Boston, MA; ³Harvard Medical School, Boston, MA; ⁴Beth Israel Deaconess Hospital, Boston, MA. (Tracking ID #2193561)

BACKGROUND: Insurance exchanges established under the Affordable Care Act seek to promote competition among health insurance plans in order to slow the growth of premiums. In order to achieve this goal, exchanges facilitate switching among competing plans. However, plan switching may result in beneficiaries needing to switch their primary care provider due to different provider networks, causing disruptions of care. We hypothesized that insurance switching would be associated with increased rates of primary care physician changes and ED utilization.

METHODS: We used the Massachusetts all payer claims database to study changes in health care utilization associated with insurance turnover, defined as switching insurance carriers (but not switching plans within an individual carrier). We included all Massachusetts residents aged 21–64 who had at least 11 months of health insurance coverage in 2011 and 2012. Our primary exposure was insurance carrier switching, which was assigned to the month an enrollee (“switcher”) began enrollment with a new health

insurance carrier. Our primary outcomes were monthly rates of ED visits and new PCP encounters. We first examined univariate characteristics of plan switchers versus those of enrollees without an insurance change (“non-switchers”). To examine changes in monthly ED visits and new PCP visits, we used propensity score methods to match all switchers with up to 3 non-switchers who were continuously enrolled with a single insurance carrier. Matched non-switchers were assigned the same insurance switch date as the matched switcher. We compared the proportion of patients with new PCP visits 6 months before and after plan switching in the matched cohort. We then used linear regression adjusting for age, sex, hierarchical condition category score, zipcode level socioeconomic indicators and health insurance type with a difference-in-differences design to compare changes in monthly ED utilization 6 months before and after a switch.

RESULTS: Our study cohort had 1,557,954 MA residents, which included 254,874 (16.4 %) switchers during 2011–2012, of whom 139,314 (99 % of those with outcomes available 6 months before and after switching) were matched to 383,973 non-switchers. Overall, patients who switched insurance were more likely than non-switchers to be younger (mean age 40.6 vs. 43.2), have fewer comorbidities (mean HCC score 0.50 vs. 0.84), and initially have non-group commercial (11.5 vs. 5.3 %) or Medicaid managed care insurance (7.7 vs. 2.8 %, all comparisons $p<0.001$). In our propensity score matched cohort, the rate of new PCP appointments in the first 6 months after an insurance change almost doubled (6.3 % vs. 3.4 %, $p<0.001$). In unadjusted matched analysis, the period after insurance switching was associated with a sustained increase in ED visit rate (Figure). After adjustment, the month of a switch was associated with a 26 % increase (3.41 to 4.29 visits/100 persons) in the rate of ED visits for switchers vs. non-switchers. Moreover, this significant increase in ED visits sustained for at least 6 months after switching, declining from an additional 0.51 to 0.27 ED visits/100 persons (all $p<0.004$). The period from the month of a switch through 6 months afterward was associated overall with an additional 3.23 ED visits per 100 persons.

CONCLUSIONS: In a large cohort of continuously insured MA residents, we found that insurance switching is common and associated with PCP switching and increased ED utilization. Despite the lower overall health risk among switchers, we found a period of significantly increased risk for ED utilization in the 6 months after insurance switching which decreased over time. This study is limited by its observational design, however we use propensity matching and a difference-in-differences design using all available information to isolate the effect of switching. These findings suggest that insurance turnover is not frictionless and can be associated with adverse consequences.

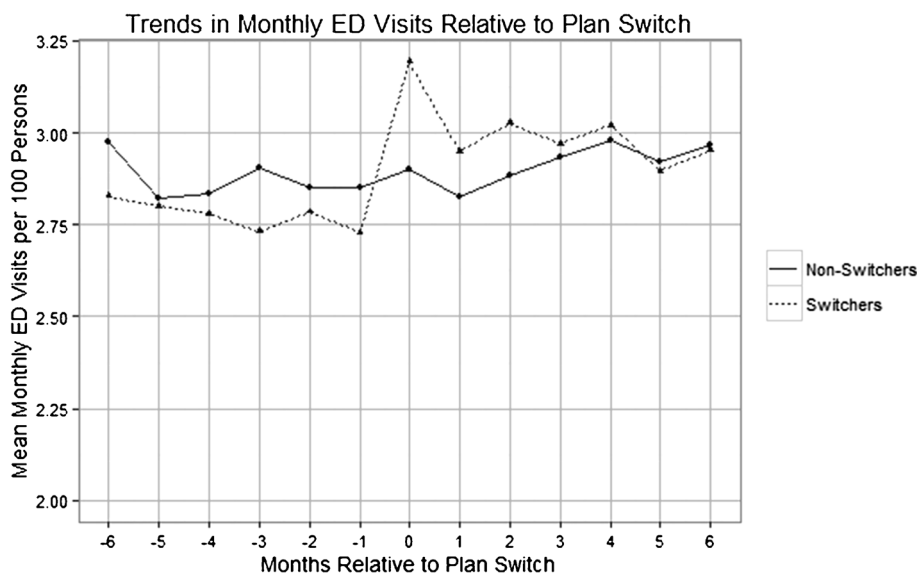


Figure: Unadjusted monthly ED visit rates for the matched population, comparing switchers (dashed line) to non-switchers (solid line), relative to month of plan switch.

INTEGRATED CARE INCREASES EVALUATION BUT NOT TREATMENT FOR CHRONIC HEPATITIS C VIRUS INFECTION IN PRIMARY CARE Aaron D. Fox^{1, 2}; Laura C. Hawks²; Brianna L. Norton^{1, 2}; Alain H. Litvin²; Chinazo Cunningham^{1, 2}. ¹Montefiore Medical Center, Bronx, NY; ²Albert Einstein College of Medicine, Bronx, NY. (Tracking ID #2199406)

BACKGROUND: Complications from chronic Hepatitis C Virus (HCV) infection now account for more deaths in the United States than Human

Immunodeficiency Virus. New medications that directly target HCV have greater efficacy and fewer side effects than older interferon-based regimens, making HCV cure probable and HCV treatment a high priority. However, barriers to care, including fragmentation in the health care system and provider stigma toward drug users, lead to under-utilization of HCV treatment. Treating drug users in primary care settings instead of relying on outside referral to specialty centers may lead to greater rates of evaluation, treatment uptake, and cure for chronic HCV infection. We developed a model for integrated HCV care in

primary care and investigated rates of HCV evaluation and treatment before and after implementation.

METHODS: Starting in 2011 ("implementation"), primary care physicians (PCPs) at a federally qualified health center (FQHC) in New York City referred patients for integrated HCV care, which was provided onsite at the FQHC by an infectious diseases specialist. PCPs contacted an HCV patient navigator via the electronic medical record and she assisted with scheduling appointments, arranging imaging or liver biopsies, and acquiring prior authorization for medications. Before implementation, all referrals were made to an offsite hepatology clinic located at an affiliated academic hospital. For this analysis, we extracted electronic medical records (Jul 2009 to Oct 2014) for patients with HCV who received primary care at a post-incarceration transitions clinic located within the FQHC. Sociodemographic and clinical data was collected. Patients with chronic HCV infection (positive antibodies and detectable HCV RNA) were included. We compared referrals, referrals completed (≥ 1 HCV specialist visit), treatment uptake (documented prescription for HCV treatment), and HCV cure (treatment completion with post-treatment undetectable HCV RNA) before and after implementation. For subjects completing specialist referral, we also derived a reason for not initiating treatment based on documented clinical information.

RESULTS: Of 451 patients receiving primary care at the FQHC's transitions clinic, 108 were HCV positive. Of these, the median age was 50, and most were male (93 %), Hispanic non-Black (62 %), and had Medicaid insurance (97 %). Common co-morbidities included HIV infection (42 %), depression (26 %), and either current (70 %) or past (13 %) opioid use disorder. Of 89 with chronic HCV infection, 73 initiated care after implementation and 33 were referred for specialist evaluation. Sixteen initiated care before implementation and 12 were referred for specialist evaluation. After implementation, referrals completed were greater (24/33 vs 4/12, $p=0.03$), but treatment uptake (6/33 vs. 1/12, $p=NS$) and cure (3/33 vs. 1/12, $p=NS$) were no different than before implementation. Not initiating treatment was most commonly due to loss to follow-up, but 4 patients were awaiting insurance approval, and 5 patients were recommended to wait for better treatment options.

CONCLUSIONS: Rates of chronic HCV infection were high in this sample of formerly incarcerated individuals, and after implementation of integrated HCV care at the FQHC, more of those referred to an onsite HCV specialist completed the referral than before implementation. Rates of treatment initiation and cure did not differ before and after implementation, but several patients were awaiting insurance approval or availability of new medications, which prevented uptake of treatment. Integrating HCV care into FQHCs can increase access to an HCV specialists, but additional barriers to HCV treatment uptake remain and deserve further inquiry. New HCV medications offer great promise, but in order to reach those most in need of treatment, such as formerly incarcerated drug users, ongoing research into innovative HCV care delivery models that support retention in treatment will be necessary.

Sociodemographic characteristics for 89 FQHC patients with chronic HCV infection

Sociodemographic characteristics	Pre-implementation (N=16) N %	Post-implementation (N=73) N %	P-value
Age median (IQ range)	47 (42–51)	50 (46–54)	0.03
Male	16 (100)	64 (93)	NS
Race/Ethnicity			
Hispanic	15 (94)	42 (56)	NS
Non-Hispanic Black	1 (6)	19 (26)	
Other	0 (0)	12 (16)	
Uninsured	3 (19)	7 (10)	NS
HIV	4 (25)	34 (47)	NS
Depression	4 (25)	22 (30)	NS
Opioid Dependence (current)	13 (81)	50 (68)	NS

HCV treatment cascade for 89 FQHC patients with chronic HCV infection pre- and post-implementation of integrated HCV care

Treatment Cascade	Pre-implementation (N=16)	Post-implementation (N=73)	P-value
Referral made	12 (75)	33 (45)	0.03
Referral Completed*	4 (33)	24 (33)	0.02
Treatment Uptake*	1 (8)	6 (18)	NS
HCV Cure*	1 (8)	3 (9)	NS

* out of 33 referred

INTERDISCIPLINARY ADMISSIONS AND ROUNDING TO IMPROVE PATIENT OUTCOMES Surekha Bhamidipati¹; Seema Sonnad¹; Daniel J. Elliott²; LeRoi S. Hicks³; Janine Jordan²; Patty McGraw²; Bailey Ingraham-Lopresto²; Elizabeth Ivey³; Edmondo Robinson². ¹CCHS, Newark, DE; ²Christiana Care Health Services, Newark, DE; ³Christiana Care Health System, Newark, DE. (Tracking ID #2199217)

BACKGROUND: Interdisciplinary care teams are increasingly viewed as contributing to quality of care by coordinating care plans, potentially reducing adverse events and length of stay. Our health system has implemented an Interdisciplinary Admissions (IDA) team comprising a hospitalist, nurse, pharmacist, case manager and social worker. A similar team was created for daily Interdisciplinary Rounding (IDR). Physicians were present on this team only in cases where the hospitalist patients were geographically cohorted. The impact of IDR on outcomes is poorly understood and even less is known about the importance of physician participation in IDR. Thus, we examined whether daily IDR differentially impacted length of stay (LOS) and readmission rates dependent on physician participation. We also examined the additive effect of the IDA intervention on LOS and readmission rates.

METHODS: We prospectively enrolled hospitalist patients admitted from the emergency department between 7 am and 9 pm Monday through Thursday for 9 months. We tracked patients in four nursing units and documented whether the patient experienced interdisciplinary rounds with or without the participation of a hospitalist physician and categorized patients into 2 subgroups accordingly. These two subgroups were then stratified according to admission by an IDA team. All study patients were admitted during the times when hospitalist and interdisciplinary team staffing was similar to avoid impact of staffing on outcomes. Additionally, all study units were general medicine units admitting patients with similar acuity. Three of the study units implemented geographic cohorting, as a result the majority of their patients were staffed by a hospitalist and patients received IDR with the hospitalist. The fourth unit did not have a dedicated hospitalist to round with the IDR team. Admitted patients were posted to any of the study units based on bed availability. We obtained LOS and 7-day readmission data for all study patients. We then used non-parametric tests to compare intervention group LOS and readmission rates.

RESULTS: Of 1206 enrolled patients, 233 were in the IDR group without hospitalist and 973 were in the IDR group with a hospitalist. Patient characteristics and demographics were similar between groups. The median LOS for the two groups was 2.9 days. The median LOS in the IDR and IDR with hospitalist groups is 3.17 days 2.88 days respectively. The number of patients with LOS below this median LOS in the IDR and IDR with hospitalist groups was 96 (41.2 %) and 515 (52.9 %) patients respectively ($p=0.002$). After stratification of patients by IDA status, the effect of IDR with hospitalists on LOS remained the same. IDR patients were more likely to be readmitted than IDR with hospitalist patients (7.7 and 4.7 % respectively, $p=0.06$). For patients who did not receive IDA, IDR patients had a higher percentage of readmissions compared to those experiencing IDR with a hospitalist (9.3 % versus 4.8 %, $p=0.02$). However, in the IDA group, the percentage of readmissions was lower in the IDR group than the IDR with hospitalist group but did not reach statistical significance. (2.0 % versus 4.4 %, $p=0.7$)

CONCLUSIONS: IDR with attending physician participation appears to reduce hospital LOS and readmission rates. The IDA intervention may reduce readmission rates but this effect is likely attenuated by the IDR with hospitalist intervention. For institutions looking to develop IDR, it may be valuable to include physician participation to achieve reductions in LOS and readmissions.

INTERNAL MEDICINE RESIDENTS' PERCEIVED RESPONSIBILITY FOR TRANSITIONS OF CARE: A NEEDS ASSESSMENT Eric A. Young^{1, 6}; Chad Stickrath^{1, 6}; Aaron Calderon⁷; Elizabeth Chapman⁵; Jed Gonzalo²; Ethan Kuperman³; Max Lopez⁸; Christopher J. Smith⁴; Joseph R. Sweigart⁹; Cecilia Theobald¹⁰; Robert E. Burke^{1, 6}. ¹Denver VA Medical Center, Denver, CO; ²Penn State College of Medicine, Hershey, PA; ³University of Iowa Carver College of Medicine, Iowa City, IA; ⁴University of Nebraska Medical Center, Omaha, NE; ⁵University of Wisconsin School of Medicine and Public Health, Madison, WI; ⁶University of Colorado School of Medicine, Aurora, CO; ⁷St Joseph Medical Center, Denver, CO; ⁸University of Vermont, Burlington, VT; ⁹University of Kentucky, Lexington, KY; ¹⁰Vanderbilt University School of Medicine, Nashville, TN. (Tracking ID #2196402)

BACKGROUND: Adverse events after discharge from the hospital are common and costly. Preventing these requires that inpatient providers adopt safe discharge practices. Willingness to adopt these practices is dependent upon providers' perceived responsibility for patients in the transition period, yet these attitudes have not yet been studied in depth. Prior work suggests that one in four hospitalists feels that responsibility for patients ends at the time of discharge. Little is known about the degree to which Internal Medicine residents feel responsible for ensuring safe transitions of care for their patients.

METHODS: We performed a cross-sectional survey of 408 Internal Medicine residents at four academic institutions throughout the country. The 24-question survey was developed through iterative revision from faculty with extensive experience in the field of transitions of care. The survey was further refined through cognitive interviewing. Residents were invited to complete the survey electronically or through hard copy via local site-coordinators between September and November 2014. Data was analyzed using descriptive statistics for frequencies and Chi-square and Fisher's exact tests for comparisons between post-graduate year (PGY) groups.

RESULTS: Two-hundred fifty of 408 residents responded (61 %). Of respondents, 40 % were PGY-1, 30 % PGY-2, and 30 % PGY-3. In response to the question, "How many days are inpatient providers responsible for their patients after they are discharged?" 26 % of residents reported that responsibility ends at the time of discharge while 23 % reported responsibility extends to 15–30 days beyond discharge. The perceived duration of responsibility did not differ between PGY groups ($p=0.36$). One-hundred percent of respondents believed it was their responsibility to complete an accurate discharge summary within 48 h of discharge. Fifty-five percent of respondents believed they were responsible for contacting patients' primary care providers by email or phone at the time of discharge. Eighty-nine percent of residents believed they were responsible for ensuring their patients had a follow-up appointment scheduled prior to discharge. In contrast, only 22 % believed they were responsible for ensuring that patients actually attended their follow-up appointments. Ninety-nine percent of residents agreed that it was their responsibility to ensure that patients left the hospital with an accurate medication list; 86 % felt it was their responsibility to ensure that patients received in-person medication counselling prior to discharge.

CONCLUSIONS: Internal Medicine residents have variable perceptions of their responsibility for patients being discharged from the hospital. Further work is needed to determine what clinical and educational exposures modulate residents' sense of responsibility for ensuring safe transitions of care.

INTERPROFESSIONAL COLLABORATIVE CARE CHARACTERISTICS AND THE OCCURRENCE OF BEDSIDE INTERPROFESSIONAL ROUNDS: A CROSS-SECTIONAL ANALYSIS OF 18 HOSPITAL-BASED UNITS Jed Gonzalo¹; Brian McGillen¹; Judy N. Himes³; Vicki Shifflet³; Erik B. Lehman². ¹Penn State College of Medicine, Hershey, PA; ²Pennsylvania State University, Hershey, PA; ³Penn State Hershey Medical Center, Hershey, PA. (Tracking ID #2194897)

BACKGROUND: Interprofessional collaborative care (IPCC), or the process through which different professional groups work together to deliver care, is a national health policy focus specifically in the proposed changes to repayment models in the Affordable Care Act. Given hospitalized patients' care involves mutual relationships, collaboration, and decision-making between all healthcare providers, namely physicians, nurses, and patients, the need for IPCC delivery methods to improve quality in hospital settings is significant. Bedside interprofessional rounds (BIR) is a primary method of promoting collaboration in hospital-based settings, but the occurrence of BIR in medicine, pediatrics, and intensive care units demonstrate a wide variation in frequency from 1 to 80 %. No studies have investigated the frequency of BIR across different hospital-based units, or identified unit-based characteristics that may be associated with increased BIR. Following our institution's implementation of a quality metric related to BIR, we sought to: (1) examine the frequency of BIR in 18 different clinical units, and, (2) determine whether the frequency of BIR is attributable to spatial, staffing, patient, or nursing perception characteristics.

METHODS: In 2012, our 501-bed, university-based acute care hospital began an initiative to increase BIR, defined as "encounters that include at least one attending-level physician and nurse discussing the case at the patient's bedside." All front-line teams were expected to perform BIR on ≥ 80 % of patients per day in each clinical unit. Following this new initiative, we performed a prospective cross-sectional assessment (Nov. 2012-Oct. 2013) regarding BIR in 18 units providing care for both pediatric and adult patients within our hospital. The primary outcome was the frequency of BIR occurring in each unit, which was obtained from each unit's nurse manager performing "audits" on ≥ 5 randomly selected days each month during the study period. We developed 4 categories of variables hypothesized to affect BIR: (1) spatial factors, including unit type, number of beds/unit, square feet in unit/bed, (2) staffing factors including nurse-to-patient ratios, (3) patient factors, including hospital length of stay and severity of illness, and, (4) nursing perceptions of unit collegiality, staffing adequacy, support, and use of a BIR script. Data were obtained from floor plans, our hospital's clinical data warehouse, the Nursing Quality Indicators Practice Environment of the Nursing Work Index survey, and paper-based surveys administered to nurse managers. Based upon variation in BIR frequency between units, we stratified the variable into two groups: high (≥ 80 %) and low (< 80 %). Logistic regression techniques were used to identify unadjusted predictors of the main outcome.

RESULTS: Of the 18 units, six were classified as intensive care units (ICUs), four were classified as intermediate care (IMC), and eight were classified as acute care units. The average number of beds in each unit was 27 (range 14–44), with a mean 549 square feet per bed (range 203–987), with a mean nurse-to-patient ratio of 1–3.2 (range 1.5–4.5). During the study period, 29,173 patients (mean 23.5 patients per unit/day) were assessed during 1241 audited unit-days, with 21,493 patients receiving BIR (74 %). The range in the frequency of BIR was 35–97 %. Factors associated with a high occurrence of BIR were ICU (OR 13.65, [CI 4.30–43.34]), ICU vs. acute care), IMC (OR 2.83, [CI 1.19–6.73], IMC vs. acute care), nurse-to-patient ratio $\leq 1:3$ (OR 4.71, [CI 1.73–12.85]), use of rounding script (OR 3.18, CI [1.11–9.13], score of ≥ 4 vs. < 4), and provider and leadership support (OR 3.24, [CI 1.17–8.97], score of ≥ 17 vs. < 17). Number of beds, square feet in unit and per bed, patient length of stay, and severity of illness were not significantly associated with increased occurrence of BIR.

CONCLUSIONS: In our hospital-based units, the frequency of BIR exceeded 70 %, with higher frequencies occurring in ICUs than IMC or acute care units. Additional factors associated with increased occurrence of BIR were lower nurse-to-patient ratios, and nursing leadership's perceived support by providers and use of a BIR script; spatial- and patient-level factors were not associated with increase BIR. These results advance our understanding about factors impacting the occurrence of BIR in hospital units and highlight potential barriers hindering ideal patient-centered care for all admitted patients. The awareness of benefits for IPCC is increasing, and potentially will become more integrated into quality performance measures. As a result, IPCC may become more widely used in models of reimbursement for hospitals. Therefore, formal investigations into the processes of IPCC in hospitals are required to inform improvement and offer a theoretical model for informing the redesign of clinical units to be more integrated practice units that achieve higher value.

INTERPROFESSIONAL COMMUNICATION PATTERNS DURING PATIENT DISCHARGES: A SOCIAL NETWORK ANALYSIS Vincent A. Pinelli¹; Klara K. Papp²; Jed Gonzalo¹. ¹Penn State College of Medicine, Hershey, PA; ²Penn State University College of Medicine, Hershey, PA. (Tracking ID #2195653)

BACKGROUND: Optimal care delivery requires timely, efficient, and accurate communication among numerous providers and their patients, especially during the hospital discharge process. Although the ideal discharge process involves collaboration amongst care providers, existing research provides a relatively poor understanding of how professionals communicate in medicine units during patient discharges. To our knowledge, no studies have examined the discharge process using social network analysis. We sought to assess: (1) the frequency and type of communication patterns, and, (2) the network of communication patterns between providers and patients during the discharge process in a hospital-based medicine unit.

METHODS: To investigate the research objectives, we applied methods of social network analysis. Network analysis is presented as a useful way of extending understanding of conventional forms of analysis pertaining to hospital discharges. Any one individual has a limited view of the complex network in which they are involved, and by illustrating the interactions in the network that conversations might occur allows for the identification of potential improvement areas and ways to advance discharge planning research and theory. During seven days in March 2014, following a screening process of patients who had an anticipated discharge on that day and were fully oriented, starting with the soon-to-be discharged patient, one investigator performed 1:1 semi-structured interviews with the patients and all providers involved with the discharge process. To identify all potential providers in the network, a chain-sampling technique was used whereby participants known to be involved in the discharge process were interviewed first and asked to identify other providers with whom they communicated. The survey was developed for the purposes of this study, and asked respondents to report all synchronous and asynchronous communication channels within 24-h of discharge, with the following questions: (1) how often they communicated about the discharge with individuals in the network (e.g. face-to-face), (2) how often they relied on asynchronous communication (e.g. EMR) from other providers to be informed about discharge plans, and, (3) importance of that role in enabling the patient's discharge (Likert-scale 1–7, 1=not at all important, 7=extremely important). Frequencies and comparison of communication and perceived importance of each role in the discharge process were analyzed using descriptive statistics and the chi-square test. NodeXL Graphics software was used to construct sociograms of the communication channels related to patients' discharges.

RESULTS: Of the 42 patients screened, seven patients who were fully oriented and able to complete an interview and all providers who participated in their care during the discharge were selected for inclusion in the analysis. In all, 72 healthcare professionals contributing to the discharge process were interviewed (100 % response), including physicians, nurses, therapists, pharmacists, care coordinators, social workers, and

nutritionists. Patients' mean age was 63, length-of-stay was 7.8 days, and most (86 %) were discharged to home. On average, 11 roles were involved with each discharge. The majority of communication was synchronous (562 events vs. 469 asynchronous events, $p=0.004$). Most communication events occurred between the primary nurse and patient, and the care coordinator and primary nurse (mean 3.9 and 2.3 events/discharge, respectively). Intern physicians were identified as most important in the discharge process (mean 6.0, potential maximum=7), with the primary nurse (5.3) and care coordinator (5.3) rated next in importance. The intern physician was the most likely role to contribute to both the discharge instructions and discharge summary (3.0 and 2.0 contributions/discharge, respectively). The primary network diagram has a density of 0.625 (suggesting a dense network), with the intern physician and primary nurse being central to the network, with close ties to the patient. Attending physicians, charge nurses, and social workers had fewer interactions, on average, with patients around the time of discharge.

CONCLUSIONS: The process of discharging patients from the medicine service is a complex, multi-faceted process involving numerous care providers and the patient. Numerous synchronous and asynchronous methods are used amongst all providers to coordinate the patient's discharge. Intern physicians, in particular, have a pivotal role and are centrally-positioned in the network of communication during a patient's discharge, raising important questions regarding the implications of such a design, specifically related to house staff education and the ideal model for patients' discharges. Potential improvements in coordinating patients' discharges are possible by reorganizing systems to optimize efficient communication.

INTIMATE PARTNER VIOLENCE DISCUSSIONS IN THE HEALTHCARE SETTING: CONTEXT, CONTENT, AND PATIENT PERCEPTIONS Jennifer McCall-Hosenfeld; Alexa Swales; Erik Lehman. Pennsylvania State University College of Medicine, Hershey, PA. (Tracking ID #2182685)

BACKGROUND: Intimate partner violence (IPV)—psychological, physical, or sexual abuse occurring in an intimate relationship—affects almost half of US women and results in myriad physical and mental health sequelae. Given this, healthcare providers are uniquely positioned to identify and address IPV exposure. In 2013, the United States Preventive Services Task Force (USPSTF) recommended screening all women of reproductive age for IPV in the healthcare setting. This followed similar recommendations from the Institute of Medicine, the Affordable Care Act, and numerous professional organizations, which have long provided guidance governing IPV screening and response in healthcare settings. However, since the 2013 USPSTF recommendation, research has not examined the frequency of IPV screening and guideline adherent responses. We developed a survey to examine the context and content of IPV screening in the clinical setting, as well as patient perceptions of screening discussions, subsequent to the USPSTF recommendation. In addition to a descriptive analysis of the context and content of IPV screening, we hypothesize that reproductive age (18–46) (in concordance with USPSTF guidelines) and past-year history of IPV will be associated with increased frequency of screening.

METHODS: We developed and pre-tested a survey examining IPV screening in the healthcare setting in the past year. Survey content incorporated evidence-based guidelines from the USPSTF, AMA, Futures Without Violence, and the American College of Obstetricians and Gynecologists. This survey examined: 1) IPV screening context (provider specialty, gender, and the presence of others during screening), 2) content (topics discussed, educational outcomes, and actions taken by the provider), and 3) women's perceptions of screening (satisfaction, comfort, and privacy) in addition to demographics, IPV exposure, and healthcare use. Participants were women recruited from ambulatory clinics and domestic violence shelters in Pennsylvania. Inclusion criteria included female gender, age 18–65, and lifetime history of IPV measured by the Humiliation-Afraid-Rape-Kick (HARK) screening tool. All analyses used SAS version 9.3.

RESULTS: Of 213 women attending a healthcare appointment in the past year, 39 % discussed IPV with their healthcare provider, and 8 % reported initiating the discussion without being asked. Fifty-five percent were of reproductive age (18–46), and 23 % of women had experienced IPV in the past year. Forty-nine percent of all women who experienced IPV in the past year received screening. In bivariate analyses, 40 % of reproductive-aged women (18–46) compared to 42 % of older women (47–65) had screening or counseling discussions with their providers ($p=0.7$). Women with past-year IPV history received screening more frequently (49 %) than women with lifetime IPV (40 %); however, this finding was not significant ($p=0.3$). **Screening Context:** Screening providers were 58 % female, 40 % Primary Care, 16 % OB/GYN, 11 % Physician Extender, 3 % Emergency, and 2 % Mental Health. During IPV-related discussions, 10 % of women reported someone else was in the room. **Discussion Content:** Guideline-concordant topics discussed included: patient's concern about IPV (34 %), emotional (21 %) or physical (12 %) health, safety assessment (19 %), nature of IPV

(17 %), partner's substance abuse (10 %), effects on friends/family (9 %) and children (5 %). Guideline-concordant outcomes of these discussions included learning about available resources (14 %), validation of patient's experience (18 %), and development of a safety plan (13 %). Actions taken by providers included providing prescription medication (15 %), scheduling a follow-up (14 %) or mental health appointment (5 %), providing information regarding IPV (3 %) or social services (2 %), and contacting law enforcement (1 %). **Patient Perceptions:** Of 88 women who discussed IPV with their providers in the past year, none reported having confidentiality concerns. Fifty-eight percent of women reported being "extremely/very satisfied", and 53 % reported being "extremely/very comfortable" discussing IPV with their healthcare providers. Two percent had concerns that they felt were not addressed. Notably, of 139 women who attended a healthcare appointment in the past year and did *not* have a discussion about IPV, 7 % indicated that they would have liked to have this discussion.

CONCLUSIONS: Despite current recommendations, only 39 % of this high-risk population received IPV screening. Contrary to our hypothesis, women of childbearing age were no more likely to receive screening than older women. While many screening conversations regarding IPV resulted in guideline-concordant discussion and response, relatively few action-based outcomes, such as providing information regarding resources or scheduling a follow-up appointment occurred. Dedicated focus should remain on educating providers on the importance of IPV screening and guideline-concordant, action-based responses to IPV disclosure.

INVASIVE PROCEDURE TRENDS AMONG INTERNAL MEDICINE RESIDENTS AT A UNIVERSITY PROGRAM Teresa Brown¹; Ryan Wilson¹; Ramy Sedhom²; Amay Parikh¹; Ranita Sharma^{3, 1}. ¹Rutgers Robert Wood Johnson Medical School, Westfield, NJ; ²Rutgers- Robert Wood Johnson, Staten Island, NY; ³Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ. (Tracking ID #2194709)

BACKGROUND: The American Board of Internal Medicine (ABIM) expects trainees to develop competency related to the knowledge and understanding of a limited set of procedures but does not specify a minimum number of procedures needed to demonstrate competency or to satisfy training completion requirements. Graduating residents pursuing procedural based specialties (PBS) rank procedural access and skills as an important aspect of their career decision. There is little information in the current literature related to subspecialty interest among internal medicine residents and its influence on the number of procedures performed by residents.

METHODS: We conducted a retrospective analysis to determine the number of procedures performed by internal medicine residents who began training between 2006 and 2011. Preliminary year interns and residents who transferred into or out of the program during the study period were excluded. The primary end point was the difference in the total number of procedures performed over 3 years by residents pursuing PBS versus those pursuing NPBS. Invasive procedures were defined as arterial lines, femoral, jugular, and subclavian central line insertions, lumbar punctures, paracentesis, and thoracentesis.

RESULTS: One hundred nineteen residents who began training between 2006 and 2011 performed an average of 25.4 procedures (SD 20.2) during their 3 year training. Residents entering PBS ($n=29$) performed more procedures than residents entering NPBS ($n=90$) (30.7 vs 23.7, $p<0.05$). Residents entering Pulmonary/Critical Care Medicine performed the highest number of procedures amongst all residents with an average of 55.7 (statistically significant). Residents entering Cardiology and Gastroenterology performed an average of 23.1 and 23.3 procedures respectively. Residents entering Nephrology, a NPBS, performed an average of 31.9 procedures and those pursuing general medicine (hospital medicine versus outpatient medicine not specified) performed an average of 24.7 procedures. The number of procedures per resident declined by 3.0 procedures per year over the study period with no statistical difference between the PBS and NPBS groups. Procedures performed by men entering PBS declined less than women (0.7 vs 4.7 procedures/year, $p<0.01$).

CONCLUSIONS: Procedural skills are recognized as an essential part of internal medicine training. Our findings suggest that residents entering PBS performed more procedures than residents pursuing NPBS. Residents entering Pulmonary/Critical Care Medicine perform the most procedures compared to residents entering other fields. This data correlates with information obtained in post graduation surveys in which residents entering PBS viewed access and ability to perform procedures as an important part of their fellowship decision. We report an overall decline in the total number of procedures performed by residents throughout their 3 years of training from 2006 to 2011. Further research is needed to determine whether the ACGME duty hour restrictions, the increasing use of Interventional Radiology for procedures, access to simulation training and/or changes to the ABIM training requirements related to procedural competencies are responsible for these trends.

INVITING PATIENTS AND CAREGIVERS TO IMPROVE PRIMARY CARE: DEVELOPMENT OF PATIENT AND FAMILY ADVISORY COUNCILS IN THE COMPREHENSIVE PRIMARY CARE INITIATIVE Ashok Reddy^{1, 2}; Laura L. Sessums²; Edith Stowe²; Tim Day²; Janel Jin²; Bruce Finke²; Asaf Bitton². ¹University of Pennsylvania, Philadelphia, PA; ²Center for Medicare & Medicaid Innovation, Baltimore, MD. (Tracking ID #2197529)

BACKGROUND: Growing evidence suggests that engaging patients, families, and caregivers in an active partnership with the healthcare system can lead to better quality care. Despite delivery system reforms to create patient-centered primary care, evidence is limited on the structures and processes primary care practices use to engage patients in improving care delivery. The Comprehensive Primary Care initiative (CPC) is a large-scale, multi-payer test of a new primary care payment and practice transformation model developed by the Center for Medicare and Medicaid Innovation. One of the major pillars of this work is supporting patient and caregiver engagement. To our knowledge, this is the first federal primary care initiative with an explicit focus on patient engagement within the quality improvement work of primary care practices. The primary goal of our study is to describe the development of patient and family advisory councils (PFACs), one of the main structures used by primary care practices to engage patients in quality improvement. Our study describes the regional variation, membership size, composition, areas of focus, and dissemination efforts of the councils being used by CPC practices to improve patient engagement.

METHODS: CPC Practices are given three options to support patient and caregiver engagement: a) utilize quarterly in-office surveys, b) establish a PFAC, or c) to do a combination of both. Practices that choose to develop PFACs are asked to report on the following areas: content focus, composition, meeting frequency, and methods of communication about the PFAC to other patients in the practice. In our descriptive analysis, we linked practice-level characteristics gathered at the start of CPC initiative to these areas of focus.

RESULTS: In 2014, 205 of 483 CPC practices decided to develop PFACs: 35 % (22 practices) in Arkansas, 86 % (63) in Colorado, 31 % (21) in New Jersey, 50 % (36) in New York, 11 % (8) in Ohio/Kentucky, 35 % (23) in Oklahoma, and 48 % (32) in Oregon. Baseline characteristics of these practices include a median of 4 providers (IQR 2–6) and 477 (IQR 271–769) Medicare beneficiaries. Beyond regional location, there were no other statistically significant practice characteristic differences between the practices that established PFACs and those that conducted surveys. Major areas of PFAC focus include: Access (73 %), communication (62 %), care coordination (46 %), shared-decision making (42 %), care management for high-risk patients (26 %), and self-management support (25 %). The composition of PFACs included: a median of 2 (IQR 1–3) clinical staff, 7 (IQR 4–9) patients, 0 (IQR 0–1) family or caregivers, and 2 (1–3) administrative staff. Practices communicated information about the PFACs to their patients via posting material in the office (47 %), brochure in the office (35 %), website (18 %), brochure in the mail (15 %), or other (53 %) strategies (e.g., Facebook).

CONCLUSIONS: Engaging patients in primary care practice health care quality improvement efforts is a critical element of patient-centered care. Over forty percent of practices in a large-scale, multi-payer primary care transformation are actively engaged in implementing PFACs, and most are developing ways to improve patient access and communication with their patients. The CPC initiative offers an unprecedented opportunity to learn about the feasibility and scalability of PFACs, a powerful way to engage patients in primary care transformation.

IS AUTOMATED IDENTIFICATION OF HIGH-RISK PATIENTS FOR TARGETED INTERVENTIONS AS HELPFUL AS HOPED?—A PILOT STUDY

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BACKGROUND: There is substantial interest in proactive methods to identify patients at high risk for adverse outcomes (hospitalization, death), who may have modifiable factors that, if addressed, may improve outcomes or decrease costs. Application of existing risk models which incorporate a variety of clinical and socio-demographic parameters may be a useful tool for interdisciplinary teams who seek to target care for high risk populations in an efficient manner. However, little is known about the effectiveness of this type of automated approach in identifying patients for whom targeted intervention can make a positive difference. In an effort to address this knowledge gap, we sought to explore in depth the clinical characteristics of patients identified by one validated automated risk assessment model, the Care Assessment Needs (CAN) model.

METHODS: The CAN model, which has been shown to be an accurate predictor of morbidity and mortality in veteran populations, is being used as part of a Veterans Health

Administration (VHA) quality improvement pilot program, the Patient Intensive Management (PIM) program. As part of the PIM program, a population of 50 patients at our busy urban VHA teaching hospital whose CAN scores placed them in the top 10 % of overall 3-month risk for morbidity or mortality and who had had at least one acute care visit in the last 6 months was identified. In order to assess appropriateness for our team-based intervention to target modifiable factors, each of the 50 patients' charts was reviewed in a group setting by an interdisciplinary team, including at least one primary care physician, a nurse practitioner, a health psychologist, and two former military medics who function as health coaches. After initial reviews of patient charts, team members expressed concerns about the identified cohort having few factors that were potentially modifiable (e.g. patient with severe heart failure who had already received a ventricular assist device and was being followed by an advanced cardiac team), therefore we elected to apply a screening methodology that included components from other well-established high risk patient management programs (such as the Camden Coalition hot-spotting program). The relevant medical documentation for each patient in the cohort was then assessed for potential modifiable risk factors, including two or more chronic conditions, in addition to at least two of the following characteristics: five or more medications, difficulty accessing health care services, lack of social support, mental health disorder, or active drug use. In cases where there was felt to be unanswered questions after the chart review, primary care physicians were contacted for additional input. Based on this assessment, eligibility and appropriateness for the PIM intervention was determined by team discussion.

RESULTS: Fifty patients with CAN scores in the top 10 % for risk were reviewed for modifiable factors. At the time of the clinical review, two patients were determined to be long term nursing home residents, one patient was enrolled in hospice, and one patient had already died, leaving 46 patients who were potentially eligible for the PIM intervention. Using the screening protocol, 14 patients (30.4 %) of the 46 patients were classified by the interdisciplinary team as appropriate for the PIM intervention. Prior to contacting the patients for interest in enrollment, we discussed each of the 14 patients with his/her primary care provider. The providers of three patients declined to have the PIM program intervene because of extensive existing services already being provided. Each of the remaining 11 patients was contacted by phone or in person at other routine clinic visits and offered enrollment in the PIM program. Of the 11 patients, 4 patients (36.4 %) declined the intervention citing co-pay costs or lack of interest in the program. Thus, of the 50 patients originally identified by the risk assessment methodology, 7 patients with potentially modifiable factors were successfully enrolled in the PIM program.

CONCLUSIONS: Using an established risk-based model to identify a primary care population that might benefit from an intensive management program generated fewer patients than expected who were appropriate and able to be enrolled. Application of risk models to identify high-risk patients may be limited by their ability to successfully incorporate potentially modifiable factors, such as psycho-social issues, which currently require clinical chart review.

IS EXCESS MEDICATION ASSOCIATED WITH MORTALITY AMONG HIV+ AND UNINFECTED PATIENTS?

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BACKGROUND: Polypharmacy, typically defined as ≥ 5 medications, is common especially among HIV-infected (HIV+) patients. Polypharmacy has been associated with mortality, yet there is concern that these results are biased due to confounding by indication. Accounting for expected number of long-term non-antiretroviral (ART) medications, we sought to determine whether medication in excess of expectation is associated with mortality among a sample of HIV+ and uninfected patients.

METHODS: Using data from VACS, we conducted a retrospective study of ART treated HIV+ and age/race/ethnicity-matched uninfected participants engaged in care within the Veterans Affairs Healthcare System. Participants had no cancer diagnosis and received at least one long-term medication (≥ 90 day supply) in fiscal year 2009. We created a propensity model to predict expected long-term non-ART medication count (referred to as "expected medication count"). Our primary independent variable was receipt of two or more long-term non-ART medications in excess of the expected medication count. Adjusting for expected medication count and for overall disease severity using the VACS Index, we used Cox proportional hazards models to determine all-cause mortality risk over a one year follow-up.

RESULTS: Our final analytic sample included 14,592 HIV+ and 46,950 uninfected participants; of whom 3 and 2 % died, respectively. The propensity model predicting expected medication count demonstrated good fit. Disease severity, specific comorbid medical conditions, gender, age, and race/ethnicity were all significant predictors of expected medication count. Adjusting for expected medication count and the VACS Index, excess medication receipt was associated with an increased risk of mortality in both HIV-infected and uninfected participants. This did not significantly differ by HIV status.

CONCLUSIONS: Both HIV+ individuals on ART and uninfected individuals experience higher mortality when exposed to excess medication. Interventions focused on limiting medications to those most essential to quality of life and survival are needed among those aging with and without HIV.

Table. Excess Medications and All-Cause Mortality, Cox Proportional Hazards Model

Characteristic	Overall HR (95 % CI) N=61542	HIV-Infected HR (95 % CI) n=14592	Uninfected HR (95 % CI) n=46950
Expected Non-ART Medication Count	1.17 (1.15, 1.19)	1.18 (1.14, 1.22)	1.15 (1.13, 1.17)
≥2 Excess Medications	1.26 (1.09, 1.46)	1.48 (1.20, 1.83)	1.26 (1.08, 1.46)
VACS Index (5 point increments)	1.12 (1.11, 1.13)	1.07 (1.05, 1.09)	1.20 (1.17, 1.22)
HIV status	1.03 (0.89, 1.20)		
HIV*≥2 Excess Medications†	1.16 (0.90, 1.51)		

IS OVERWEIGHT OR OBESITY ASSOCIATED WITH ADVANCED LIVER DISEASE AMONG HISPANICS WITH CHRONIC HCV? Barbara J. Turner^{1, 2}; Barbara S. Taylor^{1, 2}; Joshua T. Hanson^{1, 2}; Yuanyuan Liang^{3, 2}; Jasdeep Sandhu¹. ¹University of Texas Health Science Center at San Antonio, San Antonio, TX; ²University of Texas at San Antonio, San Antonio, TX; ³UT Health Science Center at San Antonio, San Antonio, TX. (Tracking ID #2198346)

BACKGROUND: Hispanics are disproportionately affected by obesity and obesity-related diseases including nonalcoholic steatohepatitis (NASH). Among patients with chronic hepatitis C infection, it is unclear whether obesity contributes to accelerated liver

disease, possibly related to associated NASH. Among baby boomers diagnosed with chronic HCV infection in an inpatient screening program, Hispanics were over three times more likely to have advanced liver disease on ultrasound or CT imaging than non-Hispanic whites (NHW). We hypothesized that obesity may contribute to this disparity.

METHODS: Never screened baby boomers admitted to a safety net hospital in San Antonio from 12/1/2012 to 9/30/2014 were screened with anti-HCV antibody (anti-HCV) and reflex HCV RNA. Patients with newly diagnosed chronic HCV infection (HCV RNA positive) were followed through 12/10/2014 for evaluation of liver disease including results of liver ultrasounds and CT scans from system-based electronic medical records and outside imaging services. Reports were independently reviewed by 2 clinicians for evidence of likely cirrhosis or hepatocellular carcinoma (HCC). Because NASH risk is greater for overweight and obesity (heavy), BMI was categorized as lean (<25) and heavy (25+) and race-ethnicity was categorized as Hispanic and non-Hispanic (NHW/black/other). Unadjusted and adjusted odds of cirrhosis/HCC on imaging were examined for Hispanics (Y/N) and BMI (<25, 25+) using a 4-level variable for the interaction of these two factors. Other covariates included: age, gender, alcohol use (none, current non-problem drinker, past drinker, current problem drinker), and insurance status (yes/no).

RESULTS: Of 175 patients with chronic HCV infection, 125 (71 %) had subsequent liver imaging. Among imaged patients, mean BMI was similar for Hispanics and non-Hispanics who were categorized as lean or heavy (Table). Overall, 60 (48 %) patients had evidence of cirrhosis or HCC (C/HCC) on imaging but proportions with C/HCC varied widely by weight-ethnicity category. Before adjustment, the odds of C/HCC for heavy Hispanics were nearly five-fold greater than for lean non-Hispanics while the odds ratio (OR) of 2.6 for lean Hispanics versus lean non-Hispanics was not statistically significant. After adjustment, the OR of C/HCC increased to over six for heavy Hispanics versus lean non-Hispanics. In regard to other predictors, only age was associated with the odds of C/HCC increasing by 12 % per 1-year increase in age ($p=0.022$).

CONCLUSIONS: In this baby boomer cohort, we found concerning evidence that overweight and obesity in Hispanics was strongly associated with C/HCC but not in non-Hispanics. Because this effect does not appear to be explained by a difference in BMI between heavy HCV-infected Hispanics and non-Hispanics, it requires further investigation into mechanisms by which obesity and other comorbidities such as NASH, diabetes, or insulin resistance may predispose Hispanics to more rapid progression of liver disease. It also suggests that clinicians may need to address the detrimental effects of overweight/obesity in chronically HCV-infected Hispanics who have not yet developed advanced disease.

Table 1. Association of Weight and Hispanic Ethnicity with Cirrhosis or HCC on Imaging of Baby Boomers with Chronic HCV Infection

Group	N (%) N=125	BMI Mean (SD)	Cirrhosis or HCC, n (%)	Unadjusted OR (95 % CI)	Adjusted OR* (95 % CI)
Lean non-Hispanics	29 (23.2)	21.74 (2.31)	8 (27.6)	1	1
Heavy non-Hispanics	25 (20.0)	31.84 (6.39)	9 (36.0)	1.48 (0.47, 4.68)	1.66 (0.46, 6.02)
Lean Hispanics	22 (17.6)	21.76 (2.74)	11 (50.0)	2.62 (0.82, 8.43)	2.91 (0.76, 11.15)
Heavy Hispanics	49 (39.2)	30.72 (5.76)	32 (65.3)	4.94 (1.81, 13.49)	6.61 (2.01, 21.70)

* Adjusted for age, gender, alcohol use and insurance status

IS TAILORING TO HEALTH LITERACY OR NUMERACY EFFECTIVE? RESULTS OF A SYSTEMATIC REVIEW Marilyn M. Schapira⁴; Sheila Swartz¹; Pamela S. Ganschow²; Joan Neuner¹; Kathryn Fletcher^{2, 1}. ¹Medical College of Wisconsin, Milwaukee, WI; ²Milwaukee VAMC/Medical College of Wisconsin, Milwaukee, WI; ³Stroger Hospital/Rush University Medical Center, Chicago, IL; ⁴University of Pennsylvania, Philadelphia, PA. (Tracking ID #2192080)

BACKGROUND: The availability of scales to measure health literacy and numeracy present the option to tailor decision support interventions to the level of health print or numeric literacy in an individual. However, the use of a contingent versus universal approach to communication in populations that have low literate persons is debated. The objective of this study is to conduct a systematic review of the literature to address this question.

METHODS: A search strategy was developed requiring terms pertaining to 1) communication, patient education, decision making, or tailoring and 2) numeracy, mathematics, health literacy, statistics, graphical literacy, 3) screening or measurement or testing, and 4) randomized controlled trials, observational study, or experimental clinical trials. Articles were restricted to Human and English. Pub Med was searched up to July, 2014. All abstracts underwent review to ensure that they met the following initial criteria: primary research conducted, baseline assessment of education level or health literacy included, and

methods incorporated an intervention. Abstracts that met the initial criteria then underwent a full review using PICOS criteria (Population, Intervention, Comparator, Outcome, Study). PICOS criteria required a design including an intervention tailored to the individual patients' level of health literacy and a comparator group.

RESULTS: The search strategy yielded 1907 abstracts. Initial review of abstracts identified 387 that went on to full article review using the PICOS criteria. Of these 5 were identified that met the full criteria (Table). The five studies measured health literacy at baseline using the Test of Functional Health Literacy in Adults (TOFHLA), (1 study); the S-TOFHLA (3 studies); and the Rapid Evaluation of Adult Literacy in Medicine (REALM), (1 study). The 5 studies each used a randomized design. The clinical context of the interventions used included diabetes ($n=2$), hypertension ($n=1$), heart disease ($n=1$), and glaucoma ($n=1$). The methods used to tailor the intervention included the following: notification of patient health literacy level to the pharmacist or health educator delivering an intervention ($n=2$); notification of patient health literacy level to the treating physician ($n=1$); adjusting reading level of print materials ($n=1$); and adjusting level of language used to communicate information (1). Outcomes evaluated included A1C level, hypertension knowledge, communication strategies, medication adherence, satisfaction with provider, blood pressure control, satisfaction with visit, and self-efficacy of patients. Among the 5 studies, 3 reported improved outcomes in the intervention vs. control group and 2 reported no significant differences between groups. The studies reporting significant

improvements were in the clinical context of diabetes and hypertension and used tailoring approaches of 1) notifying the pharmacist, diabetic care coordinator, or physician of the patients health literacy level, and 2) adjusting the reading level of educational materials to literacy level. Studies finding no significant difference were in the clinical domains of glaucoma and heart disease and used tailoring approaches of 1) adjusting language in an educational video to literacy level, and 2) using a pharmacist based intervention that was “sensitive to patients literacy”.

CONCLUSIONS: Interventions designed for low literacy patients can be resource intensive. These findings suggest that a strategy of screening for health literacy and tailoring interventions to the patients individual literacy level may be an effective way to improve outcomes among general populations. Additional studies are needed to determine the clinical context and type of tailoring interventions that are best suited to this approach.

Manuscripts that met Inclusion Criteria in Systematic Review

Muir KW et al. *The influence of health literacy level on an educational intervention to improve glaucoma management adherence*. Patient Education and Counseling, 2011.

*Guise NB, et al. *Using health literacy and learning style preferences to optimize the delivery of health information*. J Health Comm, 2012.

*Rothman RL, et al. *Influence of patient literacy on the effectiveness of a primary care-based diabetes disease management program*. JAMA, 2004

*Seligman HK, et al. *Physician notification of their diabetes patients' limited health literacy: A randomized controlled trial*. J Gen Intern Med, 2005.

5. Kripalani S, et al. *Effect of a pharmacist intervention on clinically important medication errors after hospital discharge: A randomized controlled trial*. Ann Intern Med, 2012.

*Studies that support evidence for impact of interventions tailored to individual health literacy on clinician and patient outcomes.

ISN'T THE E-CIG SAFE, BECAUSE MY DOCTOR RECOMMENDED IT?: TOBACCO QUITLINE EXPERIENCES WITH ELECTRONIC CIGARETTES

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BACKGROUND: Electronic cigarette (e-cigarette) use is increasing in the United States. Common reasons for use are as a substitute where smoking is prohibited, to cut down or quit cigarettes, and health-related reasons. Long-term health effects of e-cigarettes are unknown, and studies on efficacy for smoking cessation have had mixed results. Given the paucity of data on clinical practice related to e-cigarettes, we aimed to identify what quitlines hear from callers about e-cigarettes and their practices regarding counseling, advising, and tracking use among callers.

METHODS: In August-September 2014, key informant phone interviews were conducted with the 13 quitline call centers that provided services to all 50 US states, District of Columbia, Puerto Rico, and Guam. These state quitlines receive about 1.3 million calls and 175,000 referrals for help in quitting tobacco use each year. The key informants were individuals responsible for supervising quitline counselors. They were asked to reflect on experiences with calls to the quitline about e-cigarettes and about practices related to e-cigarettes in the last two years. All questions were sent to the informants a week before the interview to allow them time to discuss with the quitline counselors. The transcripts from these interviews were analyzed to identify common themes.

RESULTS: Quitline supervisors reported that the issues that callers brought up most frequently to counselors included e-cigarette safety, efficacy for cessation, callers wondering if they would be considered as having quit smoking or as tobacco-free if they were still using e-cigarettes, and soliciting counselors' opinion on e-cigarettes. Most respondents reported that callers primarily asked about e-cigarette safety (e.g., one quitline counselor recalled being asked this kind of question from a caller: “E-cigs only have water, which is not harmful, right?”) and efficacy for quitting or reducing cigarette consumption; many counselors were asked whether they would recommend e-cigarettes. Other frequently asked questions included whether it was safe or recommended to use nicotine replacement therapy (NRT) with e-cigarettes, and whether the quitline provided e-cigarettes. The quitline supervisors reported that the reasons callers most frequently gave for using e-cigarettes were for use in places where

smoking is prohibited, for cutting down or quitting cigarettes, or for safety/risk reduction. Many quitline supervisors expressed concern about the amount of nicotine exposure that might result from use of e-cigarettes with NRT, and asked for guidance on how to advise e-cigarette users about NRT use or dosing. Most quitlines reported having either official or unofficial policies or protocols regarding e-cigarettes. Most quitlines asked about e-cigarette use at intake and told callers about the unknown health risks of e-cigarettes or lack of product regulation; all offered only FDA-approved cessation aids to callers. When asked what approaches quitlines would use with callers who ask for help quitting e-cigarettes, most quitlines offered counseling and/or NRT. Quitlines differed in whether they classified e-cigarette users who no longer smoked cigarettes as having quit or not quit, which has implications for re-engagement with quitline services and measuring overall quit rates among quitline callers. Quitline policies also varied with respect to use of NRT and e-cigarettes: some either did not provide NRT to those using e-cigarettes or referred the caller to a physician or pharmacist for assistance with dosing.

CONCLUSIONS: Tobacco quitline callers are increasingly asking about e-cigarettes, and quitlines are viewed as a reliable source of information about these products. Quitlines currently recommend only FDA-approved therapies for smoking cessation and generally caution callers about use of an unregulated product with unknown long-term health risks. Practices vary in screening for e-cigarette use, classification of users, and information provided to callers. Research, shared informational resources, and standardized practices are needed to help providers address e-cigarette use among patients, to encourage smoking cessation rather than dual product use, and to document and track evolving patterns of e-cigarette use.

IT TAKES TWO TO TANGO: A DYADIC APPROACH TO UNDERSTANDING THE INFLUENCE OF THE MEDICATION DIALOGUE IN PATIENT-PHYSICIAN RELATIONSHIPS ON MEDICATION ADHERENCE

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BACKGROUND: Analyses of audiotaped clinical encounters have systematically documented deficits in physicians' and patients' information exchange and question-asking behaviors related to the medication dialogue. However, most studies used one-dimensional coding schemes that tally utterances spoken by either the patient or physician, not how one influences the other thereby producing a one-sided view of the conversation. The objective of this study was to describe typologies of dyadic communication exchanges between primary care physicians and their hypertensive patients about medication-taking, and how these exchanges relate to patient medication adherence.

METHODS: Qualitative analysis of 95 audiotaped patient-physician encounters, using grounded theory methodology. Transcripts were coded using open coding (examining, categorizing data); axial coding (reorganizing data in categories based on relationships among these categories); and selective coding (identifying and describing central themes) according to patient-physician communication behaviors (e.g., question-asking type) and issues related to medication-taking (e.g., side effects). Patient medication adherence was assessed with the 4-item Morisky Medication Adherence Scale. Patients were considered non-adherent if they responded ‘yes’ to any of the 4 questions. Frequency distributions and chi-square were used to compare the association between the typologies and adherence.

RESULTS: Majority of patients were black/African American (74 %), female (58 %), unemployed (70 %), and had Medicaid (30 %) with an average age of 59 years. Physicians (n=41) were predominately female (63 %) and white (82 %), with an average age of 37 years. Physicians practiced at the clinic for an average of 5 years. Four types of dyadic exchanges emerged: **Harmonious** exchanges (45 % of interactions) are characterized by a shared power dynamic. Patients are well-informed about their condition, frequently ask questions, offer their opinion on treatments, and suggest alternatives. In response, physicians use autonomy supportive statements to affirm patients' knowledge and ask questions to elicit patients' unique knowledge about their condition. **Divergent** exchanges (29 % of interactions) are also characterized by high patient question-asking and information-seeking behaviors however; the primary purpose is to clarify physician medical language. Physicians' responses are in

the form of monologues with high frequency of directives and little assessment of patient comprehension, accentuating power imbalances. In *traditional* exchanges (19 % of interactions), patients give physicians permission to take charge of their health, agreeing with recommended treatments without question. Physician's attempts to actively engage patients in decision-making by asking probing questions and eliciting information are often unsuccessful. In *detached* exchanges (7 % of interactions), patients challenge physicians' advice and divert the conversation away from medical topics to social problems. Physicians demonstrate low engagement and use closed questions to redirect the conversation. Overall, 43 % of patients reported perfect adherence to their antihypertensive medications. Adherence rates varied by the dyadic exchange type. On average, 46.2 % of patients in harmonious exchanges reported perfect adherence compared to 30.8 % in divergent exchanges. Alternatively, only 23 % of patients in traditional exchanges reported being adherent to their medications. Finally, no patients in detached exchanges reported being adherent. The differences in adherence across typologies were non-significant.

CONCLUSIONS: Examining the mutual influence of patient-physician communication behaviors provides greater insight into the communication processes that may affect patient adherence behaviors. Preliminary findings from this research suggest that relationships characterized by a shared power dynamic between the patient and physician is associated with better patient adherence. More research is needed to identify the patient and physician predictors of the typologies of communication exchanges in order to develop targeted interventions to improve the patient-physician relationship and patient health behaviors.

JOURNAL CLUB MOBILE APP USAGE IN DEVELOPING AND DEVELOPED COUNTRIES Timothy Plante¹; Nisa Maruthur². ¹Johns Hopkins University, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD. (Tracking ID #2200319)

BACKGROUND: Use of mobile applications ("apps") has grown in parallel with mobile technology over the past decade. Even developing countries have shown rapid uptake of mobile technology, often leapfrogging conventional communication technologies such as landline telephone networks. The Journal Club app is consistently among the most downloaded for-sale medical education apps. To understand the potential of medical education apps in developing countries, we evaluated global usage of the Journal Club app. Whether there are differences in trends for visitation between developed and developing countries is unknown.

METHODS: Journal Club is an independent medical education mobile app that provides concise summaries of medical trials with content developed and maintained by physician editors in the US; Journal Club has never been advertised formally. The novel distribution platform Journal Club is available for a fee in the international Google Play and Apple App stores. Using the Google Analytics web analytics platform, which was fully integrated into the Apple iOS v1.3.2 and Google Android v1.3.2 platforms as of 11/10/14, we downloaded anonymized Journal Club app visitation data for a 5-week period (11/16/2014–12/20/2014). We identified developing countries based on the International Statistical Institute (ISI) list (2014). Using session (defined as a unique user interaction with the app at which time tracking data is collected) as the unit of usage, we compared session characteristics between developing and developed countries. We used screen display resolution in pixels (px) as a surrogate for degree of technology advancement with increased screen resolution indicating greater advancement.

RESULTS: Any use (>1 session) of the Journal Club app occurred in 77 countries. Of 139 ISI-defined developing countries, 36 had any usage of the app. Of 16,904 total sessions, 5.4 % were from developing countries (Malaysia, 19.3 %; Brazil, 15.0 %; Thailand, 8.8 %). Mean session duration (min:s) was 4:44 in developing countries vs. 4:16 in developed countries ($P=0.709$). The Android platform was more popular in developing countries (57.7 % of sessions) while the iOS platform was more popular in developed countries (70.9 % of all sessions; $P<0.001$). In developing countries, the most common screen resolutions used during sessions were 320×568 px (19.0 %), 720×1280 px (14.2 %), and 1080×1920 px (11.8 %). In developed countries, the most common screen resolutions were 320×568 px (37.4 %), 1080×1920 px (13.6 %), and 375×667 px (12.8 %). Summaries of trials in sepsis (ARISE),

coronary heart disease (DAPT), and heart failure (SOLVD) were most commonly accessed in developing countries with similar content accessed in developed countries [sepsis (ARISE and ProCESS) and coronary heart disease (DAPT)].

CONCLUSIONS: Despite a fee and the absence of a formal advertising program, more than 5 % of the use of the widely-used, independent Journal Club medical education app occurred in developing countries. Duration and content of sessions were similar in developing and developed countries. Users in developing countries appeared to use more advanced technology vs. those in developed countries and may not be representative of their countries' populations. While our results imply potential for medical education apps in developing countries, models to improve global reach to underserved areas, such as an advertising-supported model, should be evaluated. Also, future research to evaluate the effectiveness of apps in medical education is needed.

KIDNEY FUNCTION OUTCOMES IN OVERWEIGHT AND OBESE LIVING KIDNEY DONORS: A SYSTEMATIC REVIEW AND META-ANALYSIS Kalyani Murthy¹; Marwa El-Sabbahy¹; Ethan Balk². ¹Lahey Hospital and Medical Center, Burlington, MA; ²Brown Evidence-based Practice Center, Providence, RI. (Tracking ID #2198205)

BACKGROUND: Chronic kidney disease (CKD) and progression to end stage renal disease is on the rise, with more patients requiring kidney transplantation and a parallel increase in need for living kidney donors (LKD). Therefore, overweight (body mass index [BMI] 25–30 kg/m²) and obese (BMI ≥30 kg/m²) donors are increasingly being considered. Hypertension, metabolic syndrome, and CKD risk are significantly higher among overweight and obese patients and lead to higher morbidity and mortality. A recent meta-analysis showed that overweight individuals have a 40 % higher risk and obese individuals have 83 % higher risk of CKD. A recent post-transplant outcomes study (Ibrahim et al., Study 7, Table 1) showed that donors with a higher BMI had a 12-fold higher risk of having a glomerular filtration rate (GFR) <60 ml/min. However, there are limited data on short and long term kidney outcomes among overweight and obese LKDs. We aim to evaluate kidney function outcomes before and after donation among overweight and obese LKD in comparison to donors with normal BMI.

METHODS: We performed a systematic review of longitudinal studies comparing kidney outcomes in overweight/obese versus normal BMI LKDs. We conducted random-effects model meta-analyses of changes in kidney function (GFR and serum creatinine [S_{cr}])

RESULTS: Nine studies (6 retrospective and 3 prospective) provided data on obese and/or overweight donors (Table 1). Studies 1–6 included in meta-analyses provided information on GFR and S_{cr} among normal BMI and obese donors. Among them, Studies 1–3 provided complete data on kidney function outcomes for overweight, obese, and normal donors at baseline and follow-up (f/up). Study 4 excluded overweight donors. Studies 5 and 6 compared obese to normal and overweight donors. Meta-analysis of Studies 1–3 showed no statistically significant differences at f/up for both GFR (net difference=−0.7 ml/min; 95 % CI −2.4, 1.3) and S_{cr} (net difference=0.03 mg/dl; 95 % CI −0.001, 0.053) for overweight and obese donors versus normal donors. Studies 1–3 had f/up ≤1 y. Meta-analysis of Studies 1–4 (normal vs. obese donors) did not show any statistically significant differences in GFR (net difference=−0.9 mL/min; 95 % CI −3.1, 1.6) and S_{cr} (net difference=0.06 mg/dL; 95 % CI −0.02, 0.16) between the two groups. However, f/up of >1 y was limited to study 4.

CONCLUSIONS: Of 9 studies reporting kidney function outcomes among obese and/or overweight donors, we noted significant heterogeneity in data reporting including use of BMI cut-offs, f/up duration, GFR estimation methods, and reporting of S_{cr} . The heterogeneity resulted in our being able to meta-analyze only 4 of the 9 studies. In addition, reporting of important kidney function related outcomes such as proteinuria and hypertension was not uniform in most studies. Our study did not show conclusive evidence for changes in kidney function among overweight and obese donors. Given the heightened risk of CKD in patients with obesity and cardiovascular consequences of the metabolic syndrome it is essential to institute appropriate long-term f/up and documentation of kidney function outcomes among overweight and obese donors with expansion of the living donor pool.

Table 1: Kidney Function Outcomes at Baseline and Follow-Up

Study	N			BASELINE						F/UP						F/UP (y)
	BMI (kg/m ²)			S _{cr} (mg/dL)			GFR (mL/min)			S _{cr} (mg/dL)			GFR (mL/min)			
	<25	25-30	>30	<25	25-30	>30	<25	25-30	>30	<25	25-30	>30	<25	25-30	>30	
																0.5
1.Reese	2002	2108	1194	0.9	0.9	0.9	92	92	91	1.2	1.3	1.3	62	60	61	
2.Heimbach	170	211	104	1.0	1.1	1.1	99	102	100	1.3	1.4	1.4	69	72	68	1
3.Rook	87	70	21	0.9	1.0	0.9	111	117	70	1.3	1.4	1.3	70	74	45	0.16
4.Espinoza	37		37	0.9		0.8	118		112	1.2		1.3	80		72	4.25
5.O'Brien#	205		90	1.2		1.3	86		84	1.2		1.2	62		64	2
6.Tavakol@	57	27	16			0.9			87	1.1		1.2	63		64	11
7.Ibrahim *	180		75	0.9			91			1.2			63			12.2
8.Gracida ^	422		81#	0.9		0.9	116		112	1.1		1.1	79		84	6.75
																6.8
9.Noguiera %			36			0.9			91			1.2			63	

#: Overlapping of BMI cut-offs

@: Kidney function was not available for normal BMI donors at baseline

*: Kidney function was not delineated for normal BMI and obese donors

^: Study did not include SD/SE

#: Reported outcomes only among obese donors without a comparison group

KNOWLEDGE, ATTITUDES AND PRACTICES OF INTERNAL MEDICINE RESIDENTS REGARDING MANAGEMENT OF OBESITY Muhammad Umair Mushtaq; Lakshmi Mohan Viji Das; Malini Ganesh; Hussein Hamad; Ankit Mangla; Krzysztof Pierko. John H Stroger Jr. Hospital of Cook County, Chicago, IL. (Tracking ID #2199271)

BACKGROUND: Nearly 78 million adults in United States deal with the health and emotional effects of obesity every day. Obesity-related medical treatment costs nearly \$147 billion per year. Considering the huge burden of obesity-related medical issues which plague our health system, it would seem imperative that the training to deal with this epidemic should start at least at the residency level. This study was conducted amongst the internal medicine residents at two inner city teaching hospitals of Chicago to determine their knowledge, attitudes and practices (KAP) regarding the management of obesity.

METHODS: A cross-sectional study was conducted involving 110 internal medicine residents at John H. Stroger, Jr. Hospital of Cook County and MacNeal Hospital in Chicago. A standardized questionnaire was used to ascertain KAP regarding management of obesity. Respondents were asked to rate a total of 49 questions on a scale of one (strongly disagree) to five (strongly agree). A KAP score was formulated based on responses to 49 questions. Bivariate analysis, using t-test as the test of trend, was conducted to explore correlates of knowledge, attitude and practices. Linear regression was used to quantify the independent predictors of KAP score.

RESULTS: Fifty six percent of respondents were male, and 63 % were international medical graduates (IMGs). Overall, respondents' demonstrated lack of knowledge, attitude and practices (mean score, SD 144.9, 11.3; scale 49–245). A significantly higher KAP score was observed in IMGs as compared to US medical graduates ($P<0.001$), and in those who had practiced medicine for upto 5 years after graduation compared to those who started residency after completing medical school ($P=0.026$). Being an IMG was a significant independent predictor of higher KAP score (regression coefficient 7.1, 95 % CI 2.2–12.0, $P=0.005$). Respondents scored significantly low in all sections, including: knowledge regarding obesity management (mean score, SD 18.4, 1.9; scale 6–30), attitude regarding management of obese patients (mean score, SD 30.7, 3.5; scale 10–50), perceived treatment options available at their institution (mean score, SD 21.8, 4.6; scale 9–45), perceptions regarding etiology of obesity (mean score, SD 35.4, 3.6; scale 10–50), perceived personal characteristics of obese patients (mean score, SD 18.5, 3.9; scale 8–40), and interventions for effective weight management (mean score, SD 20.1, 3.3; scale 6–30). Gender of the respondents was not associated with knowledge, attitude and practices. Being an IMG predicted a higher mean score in attitude regarding management of obese patients ($P=0.005$), perceived treatment options available at their institution ($P=0.005$) and interventions for effective weight management ($P=0.007$). Those who had practiced medicine prior to joining residency (up to 5 years) had a higher mean score in

interventions for effective weight management when compared with residents who started residency soon after completion of medical school ($P=0.049$). Most of the respondents agreed that residents should be trained in nutrition counseling (80 %), exercise counseling (78 %), motivational interviewing (73 %) and weight loss medications (75.5 %). Primary care physician (23 %), nutritional dietitian (25 %), behavioral psychologist (3 %), nurse (3 %), endocrinologist (1 %) and any of these (45 %) were responded as the best health care providers to address the issue of weight management and obesity.

CONCLUSIONS: Our results show a significant lack of knowledge, attitude and practice amongst internal medicine residents in managing obesity. Our results also show that, IMGs and those, who have practiced medicine prior to joining residency, showed a better KAP than American medical graduates and those, who joined residency soon after completion of medical school. Our results indicate a perceived need for improved medical education of residents related to management of obesity and its complications.

LEARNING DURING TRANSFORMATION: A QUALITATIVE STUDY OF RESIDENTS AT PRIMARY CARE CLINICS TRANSITIONING TO TEAM-BASED CARE Joanna V. Brooks³; Antoinette S. Peters⁴; Meredith Rosenthal²; Alyna T. Chien¹; Sara Singer². ¹Harvard Medical School, Boston, MA; ²Harvard School of Public Health, Boston, MA; ³Harvard University, Cambridge, MA; ⁴Harvard Medical School, Brookline, MA. (Tracking ID #2194896)

BACKGROUND: With a decreasing number of medical graduates interested in primary care careers, the experience and perception of primary care that residents develop through their participation in primary continuity clinics is critical. However, the persistent problems of fragmented clinic sessions and disorganized clinic operation can undermine positive aspects of this experience. In 2012, the Academic Innovations Collaborative (AIC), a primary care learning collaborative for academically affiliated practices, introduced an initiative to transform concurrently educational experience and patient care at primary care clinics. At 19 sites, clinics have been working to improve primary care delivery through team-based care, patient empanelment, population management, and patient engagement. However, the impact of these changes on residents' experiences and perceptions of learning is unknown. The objective of this study is to understand residents' views on how primary care transformation to team-based care has (1) impacted their learning environment at the clinic and (2) affected their perspective on primary care careers.

METHODS: Qualitative in-depth interviews were conducted with residents who were interested in primary care careers and had spent at least one full year at one of 16 AIC clinic sites. Interviews took place between August 2014 and December 2014; 37 residents were interviewed before theoretical saturation was reached. Interviews ranged from 3/4 to

1.5 h (averaging 1 h), and followed a semi-structured interview guide. All interviews were audio-recorded and transcribed. Transcripts were uploaded to NVivo 10 qualitative data analysis software and analyzed using open coding and the constant comparative method, with intermittent discussions among investigators to reflect on findings in light of relevant literature.

RESULTS: Residents report that limited time at clinic often hinders their ability to integrate fully into a team, the key practice change objective of the AIC. Although pockets of authentic teaming are occurring for some residents, it remains an exception to more common superficial teaming, in which residents' knowledge of their "team" has few practical implications for their patient care or clinic duties. Hectic half-day clinic sessions remain a notable obstacle to residents' enjoyment of primary care, in part because scheduling often prevents trainees from being fully mentally and emotionally present during clinics. Despite these challenges, however, residents generally like learning at a clinic that is undergoing transformation. According to one resident: "getting us excited about primary care and primary care transformation is the best thing that you can do during residency." Residents believe in the value of exposure to a continually improving environment. They cite the importance of learning about both the obstacles and facilitators of real change at their clinics. Finally, interviews indicate that brief exposure during elective rotations to additional transformed primary care practices can have a positive impact on residents' perceptions about the attractiveness of primary care.

CONCLUSIONS: Although formidable obstacles remain to integrating residents into primary care change initiatives, resident trainees positively view exposure to transformation and teaming efforts. Despite the difficult work required to include "transient" residents during transformation, residents indicate that these efforts can improve their weekly experience at clinic. Exposing residents to primary care transformation also creates excitement about their future careers. Findings imply that primary care transformation leaders should (1) increase efforts to expose residents to the change process; (2) provide opportunities for resident involvement that are feasible within trainee-specific time constraints; and (3) focus on efforts to resolve the ability of residents to participate in teaming at their clinics.

LIFETIME AND RECENT INCARCERATION AND RISK OF UNCONTROLLED BLOOD PRESSURE CONTROL IN A MULTI-SITE COHORT Benjamin A. Howell¹; Jessica Long³; E. J. Edelman^{3, 4}; Kathleen A. McGinnis²; David Rimland¹; David A. Fiellin^{3, 4}; Amy C. Justice^{3, 4}; Emily A. Wang³. ¹VA Medical Center, Decatur, GA; ²VA Pittsburgh Healthcare System, Pittsburgh, PA; ³Yale School of Medicine, New Haven, CT; ⁴Center for Interdisciplinary Research on AIDS, New Haven, CT. (Tracking ID #2182563)

BACKGROUND: The United States has the highest rate of incarceration worldwide, such that more than 13 million individuals have been incarcerated in jail or prison at some point in their lives. Incarceration is associated with increased risk of hypertension and cardiovascular disease mortality. Our objective is to measure the independent impact of a history of incarceration on control of hypertension and receipt of antihypertensive medications.

METHODS: The Veterans Aging Cohort Study (VACS) is a longitudinal, prospective, multi-site observational study of HIV-infected and matched uninfected patients seen in the Veterans Health Administration (VHA). VACS contains survey data linked to the electronic medical record. Among participants who completed study follow-up between October 1, 2009 and September 30, 2010, we examined the role of self-reported incarceration history on control of blood pressure in the subsequent 12 months. We restricted our sample to those participants who responded to questions on incarceration history, had at least one blood pressure measurement in the 12–24 months before and in the 12 months after the survey, and who met criteria for having hypertension prior to the survey. Participant's self-reported incarceration history was defined as a recent history of incarceration (within the last 12 months), a past history of incarceration (during lifetime but not during the prior 12 months), or no history of incarceration. We considered participants to meet criteria for hypertension if at any point during the 12–24 month period prior to the survey they had a systolic blood pressure ≥ 140 , a diastolic blood pressure ≥ 90 , or were treated with an antihypertensive drug. Hypertension treatment was measured using the VHA pharmacy records and individuals were categorized as having received treatment if they had filled at least one antihypertensive medication in that time frame. We measured the effect of both recent incarceration and past history of incarceration on hypertension control in the subsequent 12 months following the survey. Uncontrolled hypertension was defined as having a systolic blood pressure ≥ 140 or a diastolic blood pressure ≥ 90 in the 12 months following the study survey. To analyze the independent effect of incarceration on hypertension control and receipt of antihypertensive medications, we used logistic

regression to control for age, race/ethnicity, gender, educational attainment, income, illicit drug use, unhealthy alcohol use, HIV status, and history of smoking.

RESULTS: Among the 3515 VACS participants who completed study follow-up between October 1, 2009 and September 30, 2010, 2580 participants met our inclusion criteria. Of this group, 180 (7 %) reported recent incarceration, and 1031 (40 %) reported a past history of incarceration. Participants with recent incarceration were significantly more likely to be younger and male, to have low income, to not have completed high school, and to report illicit drug and unhealthy alcohol use compared with those never incarcerated. In our sample, 1391 (54 %) were HIV-infected and there was no difference in percent of subjects HIV-infected according to incarceration history ($p=0.52$). In an unadjusted model, recent incarceration (OR=2.06 95 % CI: 1.37–3.11) and past history of incarceration (OR=1.32 95 % CI: 1.10–1.59) were associated with uncontrolled hypertension in the year after the survey when compared with those who were never incarcerated. The association between recent incarceration and uncontrolled hypertension persisted after controlling for age, educational attainment, race/ethnicity, low income, illicit drug use, unhealthy alcohol use, HIV status, and history of smoking (AOR=1.69 95 % CI: 1.11–2.58) when compared with those who were never incarcerated. However, the association between past history of incarceration and uncontrolled hypertension did not persist in the adjusted model (AOR=1.17 95 % CI: 0.96–1.42). Recent history of incarceration was not associated with decreased receipt of antihypertensive medications while past history of incarceration was, though this result similarly did not persist after adjustment.

CONCLUSIONS: Among patients with a history of hypertension, recent incarceration is independently associated with having uncontrolled hypertension in spite of receiving treatment for hypertension.

LIKE HAVING A FAVORITE CHILD? PRIMARY CARE PHYSICIAN EXPERIENCES WITH FAVORITE PATIENTS Joy L. Lee¹; Albert W. Wu²; Mary Catherine Beach². ¹Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ²Johns Hopkins University, Baltimore, MD. (Tracking ID #2192216)

BACKGROUND: It is human nature to like some people more than others. As with the 'difficult patient,' many physicians have favorite patients, yet little is known about the attributes of these patients. This analysis describes physician experiences with favorite patients and how such patients may influence how they provide care.

METHODS: Semi-structured key informant interviews were conducted with 25 primary care physicians at a large academic medical center, practicing at several clinic settings. We recruited faculty participants from the Division of General Internal Medicine via email, and conducted thematic analysis on the transcribed interview data.

RESULTS: About 75 % of participants admitted to having favorite patients. Participants generally defined favorite patients as one they looked forward to seeing. One respondent, for example, characterized a favorite patient as "someone who when I do see on my schedule, I have a little extra smile for the day." For many, favorite patients were not necessarily the most compliant patients, or those most similar to the physicians in personality or demographic characteristics. Instead, many were defined by experiences that strengthened the patient-physician bond or long term relationships during which mutual fondness and trust were developed. As one respondent explained, "They're favorites for [different reasons]. Just like you have different children and you like your children all equally, but they're different." Comparisons to challenging or 'difficult' patients often arose in the interviews. However, many respondents also recounted experiences in which once-challenging patients became favorites over time. Respondents felt sustained by bonds with favorite patients but did not think the care favorites received differed from those of other patients. "If I get a call from my difficult patient, versus my average difficult patient, versus my favorite patient, I still return that call within the same amount of time. It's not like I wait to call back. Everything is based on the triaging of, can this wait until tomorrow? Is this urgent need?"

CONCLUSIONS: Primary care physicians value patient relationships and benefit from deep bonds. A better understanding of how favorite patients benefit primary care physicians could help inform efforts to reduce professional burn-out.

LONGITUDINAL EVALUATION OF ERRORS IN DIAGNOSES: DIAGNOSIS ERRORS AND DELAYS OVER AN INTERNSHIP YEAR Joshua M. Liao; Mayya Volodarskaya; Gordon D. Schiff. Brigham and Women's Hospital, Boston, MA. (Tracking ID #2194882)

BACKGROUND: Diagnostic errors (DEs)—missed, delayed, and wrong diagnosis—are common sources of patient harm, with reported incidence of 5–15 %. DEs can include failure to make correct diagnoses at certain points in time as well as failure to follow-up

abnormal lab results. Utilizing a panel of consecutive patients cared for by a single resident over an entire internship year, this study aims to describe the epidemiology of DE by evaluating the rates of diagnosis change and abnormal lab result follow-up.

METHODS: Of 272 total patients admitted during the study period, those who were personally admitted by the intern, plus those “inherited” and cared for >2 days, were included. The primary diagnosis for each patient was tracked using written documentation from the following “time nodes”: 1. Encounters during 3 months preceding index admission (upstream records) 2. Emergency Department (ED) note associated with index admission 3. Admission note from index admission 4. Discharge summary from index hospitalization 5. Encounters during 3 months following index hospitalization (downstream records) Changes in the principle diagnosis were recorded. The Diagnostic Error Evaluation and Research (DEER) taxonomy was used to identify “where” in the diagnostic process (e.g., history, physical, lab testing, assessment) DEs occurred. Patients’ EMRs were reviewed to evaluate follow-up of abnormal results for 4 common lab types—hemoglobin/hematocrit (H/H), sodium (Na), creatinine (Cr), and thyroid stimulating hormone (TSH). For patients admitted with abnormal values, upstream records were reviewed for other abnormal values; similarly, downstream records were reviewed for patients discharged with abnormal lab values. A maximum of two abnormal values (one upstream, one downstream) were recorded per lab type per patient. For patients with multiple abnormalities per lab type, priority was given to values closest to index hospitalization and those associated with clinical encounters. Each abnormal was reviewed to see if it was noted (explicit mention of result) or assessed (documentation of diagnostic/therapeutic plan in response to result) by a clinician.

RESULTS: Of 272 patients, 197 met the study inclusion criteria. Within this cohort, 33 had their primary diagnosis changed during the study period, yielding a diagnosis change rate of 17 %. Of these, 48 % (16/33) had evidence of DEER DEs. A total of 144 DEER DEs were identified among 55 patients (28 %). Sixty-seven percent (37/55) of these patients had > 1 DEER DEs, and 37 % of total DEs occurred in the assessment step. Of 197 patients, 176 (89 %) had an abnormal result for at least 1 included lab type at admission and/or discharge. Review of upstream and/or downstream records for these patients with abnormal inpatient labs revealed 392 lab values in the 6 months surrounding the index admission. Of these selected labs, 45 (12 %) were normal (patient had no abnormal values 3 months pre/post admission) and 347 (88 %) were abnormal. These abnormal values were noted and assessed in 46 % of cases, noted but not assessed in 7 % of cases, and neither noted nor assessed in 35 % of cases. Among abnormal values that were neither noted nor assessed, 77 % (106/138) were associated with an encounter with a healthcare provider. Our analysis included documentation during two care transitions—from ED to inpatient care and from inpatient to outpatient care. For the four included lab tests, 66 % (91/139) of abnormal values obtained in the ED were neither noted nor assessed in ED notes. Forty-three percent (82/190) of results that were abnormal at discharge were neither noted nor assessed in discharge summaries.

CONCLUSIONS: Significant numbers of patients had diagnosis changes, errors in the diagnostic process, and abnormal test results that were overlooked. Multiple DEs were seen in many of the cases and occurred most frequently in the “assessment” step of the diagnostic process. Longitudinal lab follow-up tracking suggest that abnormal labs often fail to be noted or assessed by providers (35–66 % of cases across multiple care settings), even when abnormal tests were associated with health care encounters.

LORCASERIN IMPROVES THE NASH CLINICAL SCORE IN THE MAJORITY OF HIGH-RISK PATIENTS: A RETROSPECTIVE ANALYSIS OF THREE PHASE 3 STUDIES Wajahat Z. Mehal¹; Randi Fain²; Alan Glicklich³; Yuhon Li²; William Shanahan²; William Soliman². ¹Yale University, New Haven, CT; ²Eisai Inc, Woodcliff Lake, NJ; ³Arena Pharmaceuticals, San Diego, CA. (Tracking ID #2198502)

BACKGROUND: Moderate weight loss has been shown to result in histologic improvement in non-alcoholic steatohepatitis (NASH). Lorcaserin (LOR) is a selective 5-HT_{2C} agonist approved for chronic weight management. Three large, double-blind, randomized studies (BLOOM: *N Engl J Med*. 2010;363:245–56; BLOSSOM: *J Clin Endocrinol Metab*. 2011;96:3067–77; BLOOM-DM: *Obesity*. 2012;20:1426–36) have demonstrated the effectiveness of LOR in inducing weight loss in patients with a body mass index of 27 to 45 kg/m². We conducted a retrospective analysis to determine the ability of 52 weeks of LOR 10 mg twice daily (BID) to improve NASH. The NASH clinical score predicts the presence of histologic NASH and was used as an indicator of NASH activity.

METHODS: Data were pooled from 3 clinical trials of similar design comparing LOR and placebo (PBO) in overweight or obese patients with or without type 2 diabetes mellitus (NCT00603902, NCT00395135, NCT00603291). All patients received diet and exercise counseling. The modified intent-to-treat (MITT)/last observation carried forward (LOCF) population was analyzed for patients with both baseline and end of treatment NASH clinical score data. Liver parameters (alanine aminotransferase [ALT],

aspartate aminotransferase [AST]) and weight loss in the MITT/LOCF population were assessed as % change from baseline. The NASH clinical score was analyzed by comparing proportions of patients shifting from high or very high scores at baseline to low or intermediate scores at week 52.

RESULTS: Approximately 7 % of control (182/2519) and LOR-treated (190/2702) patients had a high- or very high-risk NASH clinical score at baseline. LOR-treated patients showed significant improvements vs PBO in ALT (% change from baseline to week 52, –2.4 vs 3.0), AST (0.1 vs 2.6) as well as significant weight loss (–5.8 vs –2.4), all $p < 0.001$. In an analysis of the time course of treatment effect, significant weight loss with LOR vs PBO was seen as early as week 2, with peak effect at week 36; peak effect of LOR on liver enzyme levels was at between weeks 24 and 36. Significantly more patients treated with LOR (120/190, 63.2 %) vs PBO (89/182, 48.9 %) switched from NASH high- or very high-risk at baseline to NASH low- or intermediate-risk at week 52 ($p = 0.006$).

CONCLUSIONS: LOR treatment for 52 weeks was associated with greater improvement in serum liver function test parameters than PBO, and improvement in NASH clinical score in the majority of high-risk patients. LOR may be a treatment option for overweight/obese patients with non-alcoholic fatty liver disease/NASH.

LOW BONE MINERAL DENSITY IN ADULTS WITH DEVELOPMENTAL DISABILITIES Mailee Hess¹; Elizabeth Campagna, MS²; Kristin M. Jensen². ¹University of Colorado, Denver, CO; ²University of Colorado School of Medicine, Aurora, CO. (Tracking ID #2194237)

BACKGROUND: Adults with developmental disabilities (DD) have increased risk for low bone mineral density (BMD) due to high-risk medication use, poor mobility, and endocrine abnormalities. However, no formal guidelines exist to adapt screening recommendations for this population. We sought to identify the prevalence rates, risk factors and screening patterns for low bone mineral density among a cohort of adults with DD.

METHODS: In this retrospective observational cohort study, we evaluated screening patterns and risk factors for low BMD among patients ages ≥18 years, who received ≥2 months of care during 2013 at a regional state-run facility for adults with DD. Our outcome of low BMD was defined as a Z-score or a T-score ≤ -1. We assessed for known risk factors for low BMD, including severity of cognitive delay, medication use including anticonvulsants and antiepileptics, endocrine diseases, presence of CKD and vitamin D deficiency. Subgroup comparisons were then made among persons with low BMD. T-tests and Pearson’s chi-squared tests were used when appropriate.

RESULTS: We identified 140 persons with DD meeting our study criteria of whom, 69 % were male with a median age of 43.5 yo. Out of our cohort, 46 % were screened for low BMD; of those screened, 89 % were diagnosed with low BMD (median age at diagnosis = 42yo). Those with low BMD were more likely to be older (median age: low BMD 52yo, normal BMD 46yo, $p = 0.031$), non-weight bearing (low BMD 60 %, normal BMD 14 %, $p = 0.039$), Caucasian (low BMD 82 %, normal BMD 43 %, $p = 0.025$) and have more severe cognitive delay (severely delayed: low BMD 82 %, normal BMD 43 %, $p = 0.033$). Neither anti-epileptic nor anti-psychotic drug use for >12 mo was significantly associated with increased rates of low BMD in our cohort.

CONCLUSIONS: This cohort of 140 adults with developmental disabilities had significant risk factors for decreased BMD, yet less than half were screened. We observed extremely high prevalence of low bone mineral density among those screened. Age at diagnosis in this cohort was approximately 20 years younger than USPSTF’s recommended age at which to start screening. While anti-epileptic and anti-psychotic use were not significant risk factors with respect to low BMD, we suspect this is likely due to the low number of patients with normal BMD within our cohort. Prospective studies are needed to validate these findings and inform treatment algorithms accordingly.

LOW-VALUE SERVICES IN YEAR 1 OF THE PIONEER ACO PROGRAM Aaron L. Schwartz; Bruce E. Landon; Michael E. Chernew; J. Michael McWilliams. Harvard Medical School, Boston, MA. (Tracking ID #2196053)

BACKGROUND: Reducing wasteful health care utilization is a central goal of many government and private initiatives. However, because measuring overuse is challenging, evaluations of these initiatives tend to track outcomes like overall spending or specific quality measures. This approach may fail to characterize effects on overuse accurately. For example, although recent global payment initiatives have been associated with reduced spending and improved or stable performance on certain quality measures, such findings could have resulted from reductions in high-value services affecting unmeasured quality rather than from reductions in overuse. Using claims-based measures of low-value care, we examined whether the 2012 Medicare Pioneer Accountable Care Organization (ACO) initiative was associated with reductions in the use of low-value services.

METHODS: Using 2009–2012 Medicare fee-for-service claims data, we conducted a difference-in-differences analysis comparing low-value service utilization between beneficiaries served by Pioneer ACOs and local control beneficiaries before vs. after the start of Pioneer contracts. Medicare Beneficiaries were attributed to one of 32 Pioneer ACOs (ACO group, $n=301,663$) or to a non-ACO taxpayer identification number (control group, $n=5,955,736$) according to annual allowed charges for primary care services. We constructed 32 measures of low-value care based on evidence-based lists of services that provide minimal clinical benefit. Using regression analysis, we estimated differential changes in per-beneficiary annual counts of low-value services for the ACO group vs control group, adjusted for beneficiaries' sociodemographic and clinical characteristics, as well as hospital referral region (HRR) and HRR-level changes in service use (HRR-by-year fixed effects). We decomposed overall effects according to characteristics of the low-value services (clinical category, price, and sensitivity to patient preference) and characteristics of the ACOs (financial integration between physicians and hospitals, baseline 2008 use of low-value services in the ACO service area, baseline 2008 use of low-value services in the ACO relative to the local average, and whether the ACO dropped out of the program).

RESULTS: Beneficiaries received an average of 0.45 low-value services per year, with 29.4 % of beneficiaries receiving at least one per year. Prior to 2012, annual trends in use of low-value services were similar for the ACO and control groups ($p=0.521$). In 2012, Pioneer contracts were associated with a 1.6 % overall reduction in use of these services ($p=0.001$) compared with the control group. The greatest differential reductions occurred for low-value cancer screening (-2.1 %, $p=0.006$), imaging (-1.8 %, $p=0.04$), and cardiovascular testing and procedures (-6.3 %, $p=0.05$). Differential reductions were similar for higher-priced (-1.4 %, $p=0.145$) and lower-priced services (-1.7 %, $p=0.011$), and for services sensitive (-1.4 %, $p=0.057$) and insensitive (-2.0 %, $p=0.004$) to patient preferences. Effects were greatest for ACOs with baseline use of low-value services that was higher than the local average (-3.1 %, $p<0.001$). Service reductions were unrelated to physician-hospital integration, baseline use in the ACO service area, and Pioneer program drop out.

CONCLUSIONS: The Pioneer ACO program, which introduced incentives for reducing overall spending, was associated with modest reductions in the use of low-value services during its first year. Reductions were concentrated among ACOs with high baseline use of these services relative to the local average. Financial integration between physicians and hospitals does not appear to be a prerequisite for reducing overuse under global payment reforms. Overuse measures may be a valuable addition to outcomes like spending and traditional quality measures in future evaluations of health policy interventions.

LOWER RATES OF PROMOTION OF GENERALISTS IN ACADEMIC MEDICINE Deborah Blazey-Martin¹; Phyllis Carr²; Norma Terrin¹; Janis Breeze¹; Carolyn Luk¹; Anita Raj³; Samantha E. Kaplan⁴; Karen Freund¹. ¹Tufts Medical Center, Boston, MA; ²Massachusetts General Hospital, Boston, MA; ³University of California San Diego, San Diego, CA; ⁴Boston University School of Medicine, Boston, MA. (Tracking ID #2181792)

BACKGROUND: Prior cross-sectional research has found that generalists, and especially women generalists, have lower rates of academic advancement than their counterparts in medical and surgical specialties and basic sciences. We conducted a longitudinal follow-up to assess whether these patterns persist or change over the course of an academic career, and to understand the factors including grant and publication activities that predict academic promotion.

METHODS: We conducted a follow-up survey of the 1995 National Faculty Survey cohort, which was drawn from a random sample of 24 US medical schools, and oversampled generalists, underrepresented minority faculty, and women in senior leadership positions. We supplemented online survey responses with publicly available data on academic rank, publications and grant funding. We looked at two outcomes: 1) proportion of faculty promoted to full professor, and 2) mean number of peer reviewed publications, comparing generalists with medical specialists, surgical specialists and basic scientists. We adjusted analyses by gender, race/ethnicity, and years in academics, and controlled for publications in the model for academic advancement. To determine if there were gender-specific effects, we included interaction terms for gender and specialty in the models.

RESULTS: We report on 1275 physicians who participated in the 1995 survey; half were women and 25 % were generalists. Generalists were the least likely to attain the rank of full professor by 2012 (53 %) compared with medical specialists (67 %), surgeons (66 %), and basic scientists (78 %, $p<.0001$). In unadjusted models, generalists had a lower mean publication rate (mean=44) than their three counterparts (mean=56, 57, and 83 respectively, $p<.0001$). Generalists were as likely to have federal grant funding (26 %) compared to medical (21 %) and surgical specialists (21 %), but less likely compared to basic scientists (51 %, $p<.0001$). In an adjusted analysis, all other specialty groups had more

publications than generalists. In an adjusted model, there were no differences in academic promotion between generalists and the other groups after controlling for publications. Women achieved the rank of professor at a similar rate to their male colleagues when controlling for publications, with no significant interaction between gender and specialty in the model.

CONCLUSIONS: While men and women in general medicine were less likely to be promoted than other groups of academic faculty, there were no longer significant differences in academic advancement after adjusting for number of peer reviewed publications. Further investigation into the reasons that both women and generalists have fewer publications may shed light on the barriers they face in achieving the rank of full professor, and guide interventions needed to advance their academic promotion.

Adjusted Models Predicting Number of Publications and Academic Rank

	Total Peer Reviewed Publications		Achieving Rank of Professor	
	Relative Means	95 % Confidence Interval	Odds Ratio	95 % Confidence Interval
Surgeons vs. generalists	1.3	.99–1.7	.89	.51–1.6
Medical specialists vs. generalists	1.3	.98–1.6	.78	.49–1.3
Basic scientists vs. generalists	1.5	1.2–2.0	.82	.47–1.4
Women	.73	.58–.94	.83	.58–1.2
Minority	.76	.64–.91	.67	.42–1.1
Years in academia	1.04	1.03–1.05	1.08	1.05–1.1
Publications	NA	NA	1.08	1.08–1.09

MASSACHUSETTS HEALTH CARE REFORM REDUCED EMERGENCY DEPARTMENT VISITS Amresh D. Hanchate^{1, 2}; James Feldman³; Kalpana N. Shankar³; Danny McCormick⁴; Karen E. Lasser²; Chen Feng²; Nancy R. Kressin^{1, 2}. ¹VA Boston Healthcare System, Boston, MA; ²Boston Medical Center/Boston University School of Medicine, Boston, MA; ³Boston University School of Medicine, Boston, MA; ⁴Harvard Medical School / Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2197977)

BACKGROUND: Large-scale insurance expansions, such as the Affordable Care Act (ACA), increase use of health care; whether use of the emergency department (ED) increases or decreases remains unclear, although this weighs heavily on the likely impact on health care costs. Using the quasi-experimental setting of the Massachusetts (MA) insurance expansion (2006–07), upon which the ACA was modeled, we examined the change in ED use associated with the reform.

METHODS: Applying a difference-in-differences design we compared post-reform changes in MA with corresponding changes in New Jersey (NJ), a state without health reform, to isolate the change in ED visits associated with reform. Using comprehensive administrative data, we identified all ED visits, including visits that resulted in inpatient admission, during 2004–2010 in MA and NJ among state residents aged 18 to 64. Population counts were obtained from the census data files. We estimated population rates of ED use (# ED visits per 100 census population) during 21 months prior to the start of reform (7/1/2006) and 21 months following coverage expansion (1/1/2008). Aggregating ED visits in each state by age and sex, we used difference-in-differences Poisson regression models with fixed effects for time to estimate change in ED use associated with reform. We performed similar analysis for the state population stratified by race/ethnicity (Hispanics, non-Hispanic blacks and non-Hispanic whites) and socioeconomic status (SES) based on median zip code income obtained from national census data. We performed sensitivity of estimates by varying model specifications, including aggregated counts at county and zip code levels.

RESULTS: We identified a total of 8,425,539 and 9,694,312 ED visits in MA and NJ, respectively. Pre-reform, there were 39.8 ED visits per 100 population aged 18–64 in MA; this rate increased to 41.9 ED visits in the post-reform period, indicating a 5.3 % overall increase. Adjusting for secular trends, health reform was associated with a decrease of 3.4 % (95 % confidence interval (CI) [–4.4 %, –2.3 %]) in ED use in MA. This estimate was robust to alternative aggregation of counts at county (–3.5 %) and zip code (–3.4 %) levels. Stratified analysis for minorities indicated that health reform was associated with a larger decrease in ED use among blacks (–12.4 %, 95 % CI [–14.8 %, –9.9 %]), but an increase among Hispanics (10.3 %, 95 % CI [6.1 %, 14.5 %]).

95 % CI [7.6 %, 13.0 %]). Similar analysis by SES groups indicated no significant change in ED use, associated with health reform, among the population in the poorest quartile of zip codes in MA.

CONCLUSIONS: MA health reform was associated with a decrease in overall ED use. Our finding, based on the use of an out-of-state comparison population (NJ), was robust to alternate methods, especially the choice of the geographical unit of area (state, county or zip code). In contrast, findings from previous studies, which used within-state (MA) comparison population, differed with the choice of unit of area. Further research adding data from other comparison states is needed to evaluate the robustness of the findings, particularly for racial/ethnic minorities. Additional research needs to explore the factors underlying this finding, separating change in ED use relating to health reform (e.g., improved outpatient care access) and that relating to other secular changes (e.g., growth of urgent care clinics and change in co-payments). While our finding suggests similar potential for ACA nationwide, the role of other facilitating factors, such as adequate provider availability, also need to be taken into account.

MATERNAL HEALTH SERVICES USE: COMPARING REFUGEE, IMMIGRANT AND NATIVE POPULATIONS Katherine Kentoffio³; Seth A. Berkowitz²; Steven J. Atlas²; Sarah Oo¹; Sanja Percac-Lima². ¹Massachusetts General Hospital, Chelsea, MA; ²Massachusetts General Hospital, Boston, MA; ³Harvard Medical School, Boston, MA. (*Tracking ID #2198223*)

BACKGROUND: Recent policy efforts have focused on expanding access to maternal healthcare for refugee and immigrant women. However, little is known about utilization of these services by refugee and immigrant women in a setting of near-universal health insurance coverage. We hypothesized that use of recommended maternal healthcare would be lower among refugee and immigrant women despite similar access to care.

METHODS: We created a longitudinal cohort of refugee women, age ≥ 18 years, who arrived to the US between January 1, 2001 and December 31, 2013. These women were then matched by age, gender, and date of care initiation in a 1:3 ratio, to a) Spanish-speaking non-refugee immigrants, and b) English-speaking controls. All patients received care at a single community health center in Eastern Massachusetts that serves a diverse, low-income community and is a state-designated refugee center. Our outcomes were: initiation of obstetrical care prior to the guideline recommended 10 weeks of gestational age, number of obstetrical visits during the pregnancy, and whether patients received a postpartum visit within 8 weeks after delivery. We also collected information on patient age, educational attainment (< vs. \geq high school diploma), insurance type, and baseline body mass index (BMI). To account for neighborhood differences, patient addresses were geocoded and we abstract median household income at the census tract level. For unadjusted analyses, we used chi-squared tests for dichotomous outcomes and ANOVA for continuous outcomes. For adjusted analyses, we used logistic (for dichotomous outcomes) and Poisson (for count outcomes) regression, with random effects to account for clustering introduced by repeated pregnancies among patients.

RESULTS: Of 1642 refugee and matched control women, 375 had at least one pregnancy during the study period, including 17 % (53/309) of refugee women, 27 % (186/688) immigrant women, and 21 % (136/645) control women. Only 5.9 % of women did not have health insurance, and this did not differ between groups ($p=0.20$). There were 763 total pregnancies (116 refugee, 368 immigrant, and 279 control) over a median follow up of 5.7 years (interquartile range 2.6–8.4 years). Among refugee patients, the most common countries of origin were Somalia (25.9 %), Bhutan (13.0 %), Iraq (7.4 %), and Haiti (7.4 %). Both refugee and immigrant statuses were associated with delayed initiation of prenatal care: 33.6 % of refugee women and 27.6 % of immigrant women had their first obstetric visit after 10 weeks gestational age, compared with 16.2 % of control women ($P<.001$). Refugee status was also associated with fewer prenatal care visits compared with controls (median: 12 vs. 14 visits, $p<.001$). However, once in care, refugee (73.3 %) and immigrant women (78.3 %) were more likely to have had a postpartum visit than controls (54.8 %), $p<.001$. After adjustment for the above covariates and accounting for clustering, both refugee (OR 2.76 95%CI 1.33–5.73) and immigrant (OR 1.93 95%CI 1.09–3.43) statuses remained associated with delay in initiating prenatal care, and refugee status remained associated with fewer prenatal visits (Incident Rate Ratio 0.84 95%CI 0.71–0.99). In adjusted models, refugee

(OR 2.00 95%CI 1.04–3.85) and immigrant (OR 2.83 95%CI 1.72–4.66) women remained more likely to have a postpartum visit.

CONCLUSIONS: Both refugee and immigrant women had significantly increased risk for delay in initiating maternal healthcare compared with age matched controls from the same community, despite similar access to healthcare. However, once in care, refugee and immigrant were more likely to follow-up for postpartum care. In addition to ensuring insurance coverage for maternal healthcare, targeted outreach to bring vulnerable women into care earlier may be needed to improve women and infant health for refugees and immigrants.

MEDIATORS OF DISPARITIES IN SURVIVAL AMONG PATIENTS WITH NON-SMALL CELL LUNG CANCER Anish Mehta^{1, 4}; Shannon Stock⁵; Stacy Gray⁶; David Nerenz⁷; John Z. Ayanian³; Nancy L. Keating². ¹Case Western Reserve University, Cleveland, OH; ²Harvard Medical School, Boston, MA; ³University of Michigan, Ann Arbor, MI; ⁴Harvard University, Cambridge, MA; ⁵College of the Holy Cross, Worcester, MA; ⁶Dana Farber Cancer Institute, Boston, MA; ⁷Henry Ford Health System, Detroit, MI. (*Tracking ID #2190348*)

BACKGROUND: Non-small-cell lung cancer (NSCLC) patients who are non-white, have low incomes, Medicaid or no insurance have worse survival than other patients. However, it is unclear how clinical and treatment differences contribute to the survival differences. We assessed whether racial/ethnic or socioeconomic disparities in survival for patients with NSCLC were attributable to sociodemographic factors, clinical characteristics at diagnosis, or treatments received.

METHODS: Data were collected as a part of the Cancer Care Outcomes Research and Surveillance (CanCORS) Consortium, a multi-regional observational study of newly-diagnosed lung and colorectal cancer patients. Among 4071 patients diagnosed with incident NSCLC in 2003–2005, we excluded 984 patients from one study site with <5 % non-white patients and 32 without vital status data for a final cohort of 3250 patients. Vital status was followed through 2012. We used unadjusted Cox proportional hazard analyses to estimate risk of death associated with race/ethnicity, annual income, education attainment, and insurance status. We used multivariable proportional hazard models adjusting sequentially for sociodemographic characteristics (age, race/ethnicity, sex, marital status, income, education, insurance, smoking status, integrated health system); clinical characteristics at diagnosis (stage, number of comorbid conditions); and treatments received (radiation, surgery, chemotherapy). All models adjusted standard errors for clustering by study site.

RESULTS: Overall, 65 % of patients were white, 16 % black, 7 % Hispanic, 7 % Asian, and 5 % other race/ethnicity; 36 % of patients had incomes <\$20,000/year; 23 % of patients had not completed high school; 2 % were uninsured and 4 % had Medicaid insurance. The median survival time was 494 days after diagnosis. In unadjusted analyses, mortality was higher for patients with lower income, less education, and no insurance, Medicaid, or Medicare versus private insurance (Table, all $P<.05$). After adjustment for sociodemographic factors, Hispanic patients had worse survival than white patients, as did patients with incomes <\$60,000/year vs. >\$60,000/year, non-high school graduates vs. some college or more, and Medicaid or Medicare only vs. private insurance (Table). After adjustment for clinical characteristics (stage and comorbidity), the survival disadvantage for Hispanic ethnicity and education were no longer evident, although income <\$40,000/year, uninsurance, and Medicaid insurance remained associated with worse survival. Additional adjustment for treatment explained much of the uninsurance difference, but a survival disadvantage among patients with incomes <\$20,000/year and those with Medicaid insurance persisted. After adjustment for treatment, black and Asian patients had better survival than whites (Table).

CONCLUSIONS: Survival disparities in NSCLC exist for patients with low income and Medicaid insurance, even after adjustment for sociodemographic, clinical, and treatment factors. Clinical characteristics at diagnosis account for most of the survival disparity by education, but not income. Differences in treatments received explained much of the survival disparity between uninsured and insured patients. Additional efforts are needed to assure timely diagnosis and use of effective treatment as well as improved post-treatment care to lessen these disparities.

Hazard Ratios for Mortality by Patient Characteristics, Unadjusted and with Sequential Adjustment for Sociodemographic Factors, Clinical Factors, and Treatments

Patient Characteristics	Unadjusted HR (95 % CI)	Sociodemographic HR (95 % CI)	Sociodemographic+Clinical HR (95 % CI)	Sociodemographic+Clinical+Treatment HR (95 % CI)
Race/Ethnicity (vs non-Hispanic white)				
Black	1.05 (1.00–1.10)	1.03 (0.93–1.13)	0.89 (0.79–1.01)	0.89(0.82–0.97)
Hispanic	1.08 (0.90–1.19)	1.15 (1.01–1.31)	1.06 (0.87–1.29)	0.99 (0.83–1.17)
Asian/Pacific Islander	0.95 (0.82–1.09)	0.98 (0.83–1.16)	0.82 (0.76–0.88)	0.79 (0.74–0.85)
Other	0.92 (0.62–1.35)	0.96 (0.66–1.38)	0.98 (0.69–1.39)	0.99 (0.72–1.37)
Income (vs >\$60,000/year)				
\$40–60,000/year	1.18 (1.07–1.31)	1.11 (1.01–1.21)	1.10 (0.92–1.31)	1.09 (0.94–1.26)
\$20–40,000/year	1.44 (1.33–1.57)	1.29 (1.18–1.41)	1.25 (1.10–1.43)	1.20 (0.99–1.46)
<\$20,000/year	1.40 (1.21–1.61)	1.17 (1.09–1.25)	1.21 (1.04–1.41)	1.16 (1.03–1.31)
Education (vs some college or more)				
High school graduate	1.12 (1.02–1.23)	1.09 (0.99–1.19)	1.02 (0.90–1.16)	1.03 (0.90–1.17)
< High school graduate	1.28 (1.17–1.40)	1.13 (1.02–1.25)	1.05 (0.93–1.19)	1.00 (0.86–1.17)
Insurance (vs private/HMO)				
Uninsured	1.55 (1.17–2.06)	1.35 (0.95–1.94)	1.50 (1.01–2.24)	1.21 (0.68–2.15)
Medicaid	1.50 (1.21–1.86)	1.37 (1.15–1.63)	1.34 (1.15–1.56)	1.29 (1.05–1.59)
Medicare only	1.30 (1.18–1.42)	1.09 (1.05–1.14)	1.13 (0.96–1.33)	1.16 (0.95–1.42)
Medicare+supplemental	1.29 (1.06–1.57)	1.09 (0.93–1.27)	1.14 (0.97–1.35)	1.17 (0.97–1.42)
Medicare+Medicaid	1.39 (1.14–1.70)	1.12 (0.95–1.33)	1.15 (0.83–1.60)	1.18 (0.94–1.49)
VA/other government	1.10 (0.84–1.44)	0.94 (0.78–1.13)	1.09 (0.85–1.40)	1.08 (0.85–1.38)

MEDICAID IN YOUR NEIGHBORHOOD: ASSESSING THE PRIMARY CARE INFRASTRUCTURE FOR NEW YORK CITY'S MEDICAID EXPANSION Bryant C. Webb. NewYork-Presbyterian Hospital, New York, NY. (*Tracking ID #2200181*)

BACKGROUND: Since its passage, the Patient Protection and Affordable Care Act's expansion of eligibility for the state-administered Medicaid programs has been a contentious issue for both political and practical reasons. Despite moral and system-based imperatives to expand insurance coverage, as well as long-term projected health system savings, significant concerns persist about the unintended consequences of so greatly expanding American health care's least generous payor. In New York, nearly one million previously uninsured adults across the state were expected gain health insurance through the Medicaid program—a statistic that is the source of both celebration and concern. With the second year of open enrollment underway, the impact of the expansion on New York's Medicaid roll has become a bit clearer. New York City (NYC), alone, saw the enrollment of nearly 660,000 new Medicaid beneficiaries in the first 12 months of the expansion. We set out in this analysis to further analyze the potential impact of this Medicaid expansion on NYC's primary care infrastructure.

METHODS: We used zip code level data to assess the impact of the Medicaid expansion on primary care in NYC. We selected zip codes as our geographic unit, as they were both large enough to offer adequate data points, but small enough to capture a community's primary care environment. First, we compiled the 2012 totals for Medicaid beneficiaries in each of NYC's 176 zip codes. Next, we collected Medicaid enrollment numbers from October 1, 2013—September 19, 2014. Finally, we obtained the Primary Care Health Professions Shortage Area score (HPSA score) for each NYC zip code. Of note, five zip codes were omitted from the final analysis due to an absence of Medicaid enrollment during the defined period, leaving a total of 171 zip codes included in the analysis. After splitting the zip codes into those that are and those that are not HPSAs, we compiled descriptive statistics for both groups. We calculated Pearson correlation coefficients to describe the relationship between HPSA scores and four variables describing the expansion in Medicaid: the total number of new enrollees, the percent increase in Medicaid enrollment, the percentage of the population in each zip code enrolled in Medicaid after the open enrollment period (described as "Medicaid Saturation"), and the change in Medicaid Saturation from pre- and post-Medicaid expansion.

RESULTS: The 85 zip codes that were in HPSAs accounted for two-thirds of the new Medicaid beneficiaries in the City. While there was a larger average increase in Medicaid enrollment in non-HPSA zip codes (23.0 % compared to 17.8 %), the Medicaid Saturation for HPSA zip codes increased more (8.9 % compared to 5.7 %), with nearly 60 % of the individuals in HPSA zip codes now enrolled in Medicaid. The Pearson's correlations were significant for a moderate positive correlation between HPSA scores and Medicaid Saturation in each zip code after the Medicaid expansion ($r=0.6134$, $p<0.00001$), as well as a moderate positive correlation between HPSA scores and the percent change in Medicaid Saturation in each zip code ($r=0.5123$, $p<0.00001$).

CONCLUSIONS: These findings illustrate the reality of the strain to the existing New York City primary care infrastructure. They suggest that many of the City's neighborhoods under the greatest stress for primary care services saw the greatest increase in the population percentage now newly insured by Medicaid. This realization bears important implications for clinical practice and public policy. Based on these findings, providers can anticipate increases in new Medicaid patients establishing care at their practices. The

implications of the influx of new Medicaid patients is particularly important given that the ACA's enhanced Medicaid reimbursement rates for primary care services ended with 2014. Given the New York Medicaid-to-Medicare Fee Index of only 0.42, providers and practices must extrapolate these data to better prepare for the financial implications of the Medicaid expansion. Using zip code-level Medicaid enrollment numbers also highlights the importance of implementing strategies to address the exacerbation of the primary care physician shortage. By identifying zip codes and HPSAs with the greatest enhanced need in primary care providers, existing programs can further designate priority areas in the wake of the Medicaid expansion. Finally, the concept of Medicaid Saturation at a zip code level is an important concept to guide for future conversations of optimizing physician participation and reimbursement in the Medicaid program.

Comparison of NYC Medicaid Enrollment in HPSA Zip Codes and Non-HPSA Zip Codes

	n	New Medicaid Enrollees	Average Increase in Medicaid Enrollment	Medicaid Saturation: Average Population % Enrolled in Medicaid	Average Increase in Medicaid Saturation
Non-HPSA Zip Codes	86	218,316	22.97 %	33.1 %	5.72 %
HPSA Zip Codes	85	441,274	17.83 %	60.1 %	8.94 %

Statistical Correlations Between HPSA Scores and Selected Variables

	# of New Medicaid Enrollees	% Increase in Medicaid Enrollment	Medicaid Saturation	% Increase in Medicaid Saturation
HPSA Score	$r=0.4133$ $p<0.00001$	$r=-0.3834$ $p<0.00001$	$r=0.6134$ $p<0.00001$	$r=0.5123$ $p<0.00001$

MEDICAL INTERPRETERS' HIDDEN ROLES—FINDINGS FROM A QUALITATIVE STUDY IN A SAFETY NET SETTING

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BACKGROUND: In 2013, nearly 62 million Americans (approximately 20 % of the US population) spoke a language other than English at home. In California the proportion was 45 %. Limited English Proficient (LEP) patients, defined as those unable to communicate effectively in English, need interpreters to help them with their medical appointments. Lack of professional interpretation is associated with medical errors and decreased quality of and satisfaction with care. Published professional standards for medical interpreters indicate that they should convey only what was said (without adding, omitting, or

substituting content) and should use an equivalent level of sophistication of language (referred to as “register”) as the speaker. We sought to understand how closely interpreters adhere to these standards, what they perceive as the scope of their professional role, and the challenges they face in their work.

METHODS: We conducted in-person, qualitative interviews with 17 members of the interpreting team (10 women, 13 languages). We created an interview guide which contained questions about typical patient interactions, problems interpreters regularly encounter, how they cope with these problems and how clinicians help or hinder effective communication. Interviews were digitally recorded and transcribed. Investigators developed a codebook following an open coding methodology informed by Grounded Theory. Two team members coded each transcript independently, met regularly to discuss emerging codes and discrepancies in coding until consensus was reached.

RESULTS: Key themes are summarized in Table 1. We provide representative quotes from interpreters and compare them to the 2005 published national standards for interpreter conduct. Interpreters reported informal expansion of duties beyond those outlined in the professional standards to improve and support clinical communication and institutional navigation. Strategies employed include modifying interpretations in order to simplify meaning to facilitate patient understanding, developing personal relationships with patients, and assisting with navigating the health care system (e.g. insurance, scheduling). Several identified themselves as community leaders both within and outside of the clinical setting.

CONCLUSIONS: Gaining insight into the valuable roles medical interpreters play can help clinicians and other members of the healthcare team optimize their interactions with interpreters in order to better serve LEP patients.

Table 1. Key Themes

Theme	Participant Quote	2005 Professional Standards
Interpreters make adaptations to technique, “lower the register,” to be effective in their roles	“The way that he asked the question, ... it was vague. He wanted to know specifically. He wanted me to emphasize. But when I ask the questions the patient was not ... right to the point. The patient would say, ‘Well, you know what, I...’ I said, ‘Sorry, but the doctor is asking this question.’ And then, ‘[says own name], could you help him with that?’ ... You have to understand that. When we interpret... The doctor asks a question and we have to go by a register and ask... And if we see that there’s some problems ... we have to come down on register.”	“The interpreter renders all messages accurately and completely, without adding, omitting, or substituting. For example, the interpreter repeats all that is said, even if it seems redundant, irrelevant, or rude.”
Interpreters are active advocates supporting patients to navigate a complex health care system	“But I explain to them this is not too much blood in your body, because they turn around and they say, ‘Why don’t you take out more blood from my body and then I don’t have high blood pressure?’ So, what I did, I told them it’s like a pipe; the water flow very fast, like a garden hose, and then if it’s flowing fast, pretty soon it’s gonna burst and you have a stroke.”	“The interpreter replicates the register, style, and tone of the speaker. For example, unless there is no equivalent in the patient’s language, the interpreter does not substitute simpler explanations for medical terms the provider uses...”
Interpreters play a range of social roles in their communities	“I explain to them the system that we are using here.... And after that, if they wish to come into our clinic in the future, ... I do make the appointment, follow up appointment for them, whatever they need. In some cases sometimes they need to use medication right away. Sometimes I directly help them with own pocket money ... to get their medicine right away because they need to use it right away.”	[see above and below]
	... my job you think it’s not only interpret. Outside that, many, many, many... the people have... needs help, outside. They call at night during Sunday and Saturday, ... because they need so many things, these welfare things. And they need so many things;	“Interpreter limits personal involvement with all parties during interpretation assignment.”

MEDICAL STUDENTS’ PERCEPTION OF THE PATIENT-CENTERED LEARNING ENVIRONMENT Mark V. Wilcox²; Megan S. Orlando²; Cynthia S. Rand²; Janet Record¹; Colleen Christmas¹; Roy C. Ziegelstein²; Laura Hanyok¹. ¹Johns Hopkins Bayview Medical Center, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD. (Tracking ID #2196272)

BACKGROUND: Patient centered (PC) care has been identified as a core aspect of quality health care by multiple organizations, including the Institute of Medicine. PC care is now regularly taught in formal undergraduate medical education; however other aspects of the learning environment may impact students’ adoption of PC beliefs and behaviors. Some research suggests that students’ PC attitudes decrease as they progress through medical school. It is unclear how PC attitudes differ by gender.

METHODS: We sent an online anonymous survey to all 498 medical students (years 1–4) in one medical school using a modified version of the Communication, Curriculum, and Culture (C3) instrument, a validated questionnaire that quantitatively measures 3 PC domains: role modeling, students’ experience, and support for students’ own PC behaviors. We also included two qualitative survey items to characterize students’ personal PC experiences and analyzed these responses for common themes. Quantitative data were compared by gender and class year.

RESULTS: One hundred fifty-six of 498 students responded, for a response rate of 31.3. Forty-nine percent of respondents were female and 51 % were male. The response rate for preclinical and clinical students was similar, with 77 year 1/2 (preclinical) and 79 year 3/4 (clinical) student responses. Preclinical students reported greater patient centeredness than clinical students in all three domains: role modeling (mean 5.27 vs. 4.96 on 7-point Likert scale, $P=0.03$), students’ experience (mean 3.84 vs. 3.22 on 5 point Likert scale, $p<0.0001$), and support for students’ own patient-centered behaviors (mean 4.24 vs. 3.76 on

5-point Likert scale, $P=0.0009$). Aggregated across all four years, female students reported decreased support for their own PC behaviors compared to male students (mean 4.15 vs. 3.83, $P=0.03$). Qualitative analysis of students’ responses to survey items asking about their most positive PC experiences revealed the following themes as important to students: (1) explicit PC teaching in the curriculum, (2) positive role modeling, (3) independent time to interact with patients, and (4) students’ views of themselves as patient advocates. Themes that were identified from descriptions of students’ most negative PC experiences are the following: (1) negative role modeling (with subthemes of ignoring patient concerns, poor communication, and lapses in professionalism), (2) students discouraged from performing PC behaviors, and (3) objectification/lack of humanism.

CONCLUSIONS: In this single-institution study, students’ reports of patient-centeredness decreased as students progressed from preclinical to clinical years. Female students reported less support for their own PC behaviors. Themes from the qualitative analysis indicated that formal learning methods in courses and on clinical teams contributed to PC learning experiences. Positive and negative role modeling were also important. This study could serve as a needs assessment for improving the PC education that medical students receive and for examination of potential changes in learning environments in the preclinical and clinical years in other schools.

MEDICARE FEE CUTS AND PHYSICIAN-HOSPITAL INTEGRATION Zirui Song^{2, 1}; Jacob Wallace³; Hannah Neprash³; Michael McKellar¹; Michael E. Chermew¹; J. Michael McWilliams¹. ¹Harvard Medical School, Boston, MA; ²Massachusetts General Hospital, Boston, MA; ³Harvard University, Boston, MA. (Tracking ID #2193920)

BACKGROUND: Physician practices are increasingly integrating with hospitals. For physicians, the expansion of risk contracts (e.g. accountable care organizations) makes independent practice more challenging. For hospitals or health systems, acquiring practices helps them control referral patterns, coordinate care, and improve their bargaining power with payers. Physician fee cuts might also accelerate integration by reducing payments in the office relative to the hospital setting. In cardiology, for example, Medicare cut office-based fees by 10–40 % in 2010. Office payment for a myocardial perfusion image was cut 26 % and for an echocardiogram 16 %, while hospital outpatient department (HOPD) fees for these services remained relatively unchanged. This widened the already existing payment gap favoring HOPDs—by 2013, an echocardiogram cost Medicare 141 % more in HOPDs than in the office. The American College of Cardiology (ACC) projected a surge of integration, with physicians giving up ownership for more predictable salaries. Understanding to what extent this happened is important given current fee cut debates.

METHODS: We analyzed 2007–2012 claims in a continuously-enrolled national sample of traditional Medicare beneficiaries and commercially-insured adults. We studied prices and volume in the office versus HOPD setting before and after the fee cut. We measured physician-hospital integration by calculating the share of volume billed in HOPDs. This captures both shifts in care to HOPDs and changes in practice patterns induced by integration. We focused on 3 categories of services—myocardial perfusion imaging (MPI), echocardiograms, and electrocardiograms—as well as cardiovascular imaging in aggregate and cardiovascular medicine services in aggregate. We expected estimates to trend in the same direction. As falsification tests, we examined endoscopies, which can be provided in the office or HOPD but did not undergo a fee cut, and office visits, which are billed by physicians across specialties. We used segmented regression to assess changes in integration growth after the fee cut. Independent variables included age, sex, trend, post-intervention indicator, and the interaction between post-intervention and trend. We also included quarter and metropolitan statistical area (MSA) fixed effects, and risk scores where possible. In sensitivity analyses, we tested alterations in the variables and model. Standard errors were clustered by MSA.

RESULTS: Our sample included 806,266 Medicare beneficiaries averaging 75.7 years old, 53.3 % female, representing all states, and 12,567,069 commercially-insured individuals between 55 and 64 years of age, 52.8 % female, with a similar geographic distribution. Across all services, prices favored the HOPD setting after 2010. In Medicare, 21.1 % of MPI took place in HOPDs before the fee cut; this increased to 32.4 % after the fee cut. Growth in the HOPD share was 5.9 percentage points per year ($p < 0.001$) faster after 2010. Similarly, 22.1 % of echocardiograms and 29.9 % of electrocardiograms were done in HOPDs before 2010. After 2010, these increased to 31.7 and 35.2 %, respectively. HOPD shares grew faster by 3.9 and 2.7 percentage points per year ($p < 0.001$), respectively, after 2010. Aggregate analyses of all cardiovascular imaging and cardiovascular medicine services produced qualitatively similar results. Similar results were also found in commercial populations, suggesting that integration was associated with comparable effects across payers. Sensitivity analyses supported the main estimates. In falsification tests, the share of endoscopies in HOPD did not change after 2010. Moreover, the HOPD share growth of office visits before 2010 was lower than that of cardiovascular services, suggesting that cardiologists were not integrating faster before the fee cut.

CONCLUSIONS: Integration accelerated after the fee cuts. This is consistent with the 2010 ACC Practice Consensus, which found that 40 % of cardiologists planned to integrate with hospitals due to the fee cuts and 13 % were considering it. The Medicare Payment Advisory Commission estimated that if cardiac imaging alone continued to migrate to HOPDs, nearly all would be provided there by 2021 costing an additional \$1.1 billion per year to Medicare and \$290 million per year in beneficiary cost-sharing. Our results may not be causal or generalizable. The effect of any given fee cut depends on its magnitude and substitution opportunities from higher-margin services or payers. Ultimately, integration may offset fee cuts, both because facility fees are higher and because of higher prices via market power. HOPDs can be appropriately more expensive due to costs of maintaining standby capacity, licensing requirements, ancillary services, and more complex patients. But it may be inappropriately expensive if equivalent quality care can be delivered in the office. Policies to narrow payment differences across settings may be increasingly discussed given potential fee cuts across payers.

MEETING THE PRIMARY CARE NEEDS OF TRANSGENDER PATIENTS: USING AN OBJECTIVE STRUCTURED CLINICAL EXAM CASE TO ASSESS RESIDENT PHYSICIANS' ABILITY TO PROVIDE PRIMARY CARE TO TRANSGENDER PATIENTS Richard E. Greene; Colleen Gillespie; Kathleen Hanley; Jennifer Adams; Sondra Zabar. NYU School of Medicine, New York, NY. (*Tracking ID #2198889*)

BACKGROUND: Transgender patients often report limited access to comprehensive, affirming primary care and many providers report inadequate knowledge and training in transgender health issues. We developed a transgender health OSCE case in order to assess resident physicians' comfort with and skills in addressing routine health concerns of a transgender patient.

METHODS: The transgender health case involved a 45-year old transgender woman is returning a month after a brief initial visit for a routine check-up to monitor her blood pressure and follow-up on blood tests. The clinical challenge for residents is to address the patient's high potassium levels which are associated with the androgen suppressant she is taking (spironolactone). This case was completed by 24 primary care internal medicine residents as part of a 10-station annual OSCE. A highly trained standardized patient (SP) rated the core communication and patient activating skills of the residents as well as specific items tailored to each clinical case which for this case included: asking about gender identity, eliciting medically relevant information regarding transition (use of hormones, surgery history), and recognizing link between androgen suppressant and high potassium levels and importance of this medication to the patient. Assessment items used a behaviorally anchored scale with not done, partly done and well done as response options. Frequencies are reported for specific items assessing transgender health competencies and mean communication s and patient activating scores were compared between this case and other OSCE cases using repeated measures ANOVA. SP's comments about the performance of residents are reported as were residents comments about the case, collected through a survey administered after the OSCE.

RESULTS: While overall communication and patient activating scores for this case did not differ significantly from other cases in the same OSCE, results suggest both strengths and weaknesses in residents' comfort with and skills in addressing transgender health issues. Eighty-five percent of residents fully and sensitively elicited relevant medical information regarding transition, 71 % recognized the link to high potassium levels, and 88 % recognized the importance of the androgen suppressant medications to the patient. However, only 38 % directly asked about the patient's gender identity and 58 % made the patient feel comfortable, normalizing her gender identity and not making her feel different than other patients. The SP reported that most residents treated her with sensitivity although one resident suggested a referral to a psychiatrist and another said that she "was not my typical patient". Residents reported not being as familiar with transgender health issues as they would have liked as well as wanting to become more comfortable addressing transgender health, "being honest about" what the resident didn't know, and generally knowing more about transition and how to ask questions about gender identity and transition in a sensitive manner.

CONCLUSIONS: Performance in this case and residents' self-reports suggest the need for greater education and training in both core transgender health issues and in how to provide affirming and supportive healthcare. While most residents addressed the core health issues faced by this transgender patient, fewer residents appeared fully comfortable exploring her gender identity and experiences.

MENTAL HEALTH TRAINING NEEDS ASSESSMENT IN INTERNAL MEDICINE RESIDENCY PROGRAM Lucille M. Torres-Deas²; Angela Jeffers²; Kristin A. Swedish²; Viraj V. Patel¹; Deborah Swiderski². ¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (*Tracking ID #2198906*)

BACKGROUND: Mental health disorders are prevalent in primary care; however, it is unknown if internal medicine residents feel prepared to address mental health in the primary care setting and what gaps may exist in their training. We conducted a needs assessment to evaluate internal medicine residents' training needs on depression, anxiety, and psychological distress to inform curricular development and improvements.

METHODS: We conducted a cross-sectional survey assessing the attitudes towards training needs on diagnosis, counseling, and pharmacological management of depression and anxiety, and diagnosis and counseling of psychological distress to internal medicine housestaff in the categorical and primary care tracks at a large urban academic medical center between November 2013–April 2014. Measures were adapted from a survey that was administered to residency training directors published by Leigh, et al. in 2005. We also collected information on year of training, residency track category (primary care vs. categorical), future career plans, gender, and attitudes regarding the role of primary care providers providing mental health care. We conducted descriptive analysis calculating means and frequencies using SPSS 18.

RESULTS: Seventy-six of 159 (48 %) residents completed the survey between November 2013–April 2014, of which 65 % were from the categorical track and 35 % from the primary care track. The majority of residents indicated receiving some education in diagnosis and pharmacological management of depression, anxiety, and psychological distress. Less than half had received training in counseling, regardless of program (categorical vs. primary care). Most residents felt that their training in the diagnosis of depression, anxiety, and psychological distress was adequate, but fewer felt that their training in counseling of patients with depression (50 %), anxiety (43 %) and psychological distress (58 %) was adequate. Regarding pharmacological management of depression and anxiety, 53 and 33 % (respectively) felt that their training was adequate. The majority of responders desire more education in counseling patients with depression (68 %), anxiety (64 %), and psychological distress (71 %) and in the pharmacological management of depression (68 %) and anxiety (76 %). Eighty percent believe that primary care providers should treat uncomplicated psychiatric conditions. Fewer than half of responders did not think that any patient with a psychiatric condition needed to be referred to a psychiatrist.

CONCLUSIONS: While most residents had received training in diagnosis and pharmacological management in common mental health problems seen in primary care, the majority felt that they would like more training to develop their skills to address mental health issues in counseling and pharmacological management. Curricula addressing these skills may help fill important gaps in resident education.

MOBILE TECHNOLOGY ACCESS, USAGE, AND ATTITUDES AMONG LOW-INCOME, MINORITY INDIVIDUALS IN EAST HARLEM, NY Victoria L. Mayer^{1, 1}; Kezhen Fei¹; Brigitte Buquez¹; Rennie Negron¹; Ellen P. Simon²; Carol R. Horowitz^{1, 1}. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Union Settlement Association, New York, NY. (Tracking ID #2199397)

BACKGROUND: Chronic diseases and their complications disproportionately affect low-income and racial/ethnic minority populations in the United States. Mobile technology, accessible on hand-held cellular phones and smartphones, has been championed as a method of improving population health and reducing health disparities. The Pew Research Center estimates that nationally over 90 % of African-American, Hispanic/Latino and White adults own cell phones, as do 84 % of those with a household income under \$30,000; 14 % of adults use technology to track health. Few studies have examined mobile technology use related to health in specific vulnerable populations. As part of a community-driven process of developing a technology platform to disseminate diabetes-prevention strategies, we characterized access to, usage of, and attitudes towards mobile technology, particularly for health promotion purposes, in East Harlem, NY.

METHODS: Members of the Community Action Board (CAB) of the East Harlem Partnership for Diabetes Prevention, a 10-year old community-academic collaboration, were involved in all stages of survey design, data collection, and analysis. Survey items included questions from the Pew Research Center surveys on technology use, supplemented by items developed by CAB members related to preferences for a diabetes prevention app and use of social media for community change. After survey piloting and revision, we invited English- and Spanish-speaking adults to complete the five minute written or verbally administered survey. We utilized a convenience sample of adults attending Community Based Organizations, including a food pantry, a school, a church, several social service delivery sites and health clinics. We examined the demographics of our sample, frequency data for each item, and relationships between demographics and electronic health tracking, using chi-square tests and multivariable logistic regression models.

RESULTS: We surveyed 104 individuals (67 % response rate); 73 % were female, 65 % Hispanic and 26 % African-American. The mean age was 37 years old (SD 13). Many were low-income (48 % with <\$30,000 in income/year), 40 % had less than a high school education and 36 % were uninsured. Most (82 %) owned a cell phone, 87 % of whom had smartphones. Of smartphone owners, 39 % reported having an app to help track or manage their health (30 % for exercise, 13 % diet, 4 % diabetes). Respondents were interested in using their phones to share information to change their community (62 %), recognize symptoms of health problems (87 %), prevent diabetes (77 %), find out about local health events (70 %), and track exercise and diet (69 %). Many (69 %) were concerned about maintaining privacy while online. African-Americans were more likely to track their health electronically (through website,

online tool or smartphone) (41 % vs. 12 % of Hispanic/Latinos vs. 10 % of those of other race/ethnicity, $p=0.004$). Respondents who had graduated from high school were more likely to track their health information electronically (27 % vs. 5 % of those with less than a high school education, $p=0.006$). There were no significant differences in health tracking by income or gender. Multivariable logistic regression indicated that while African-Americans were more likely to track health electronically (OR 4.22; 95 % CI: 1.28–13.88), this effect was no longer significant after adjusting for education (OR=2.46; 95%CI: 0.66–9.23).

CONCLUSIONS: This population of low-income minority adults has high cellular and smartphone ownership, and many use apps to manage their health. Despite privacy concerns, many more would like to use health promoting apps that not only provide interactive individualized health tools, but also offer information about health and local resources and allow users to participate in promoting social and community change. In order to reach vulnerable populations, mobile tools for health promotion will need to be tailored, especially for those with less than a high school education.

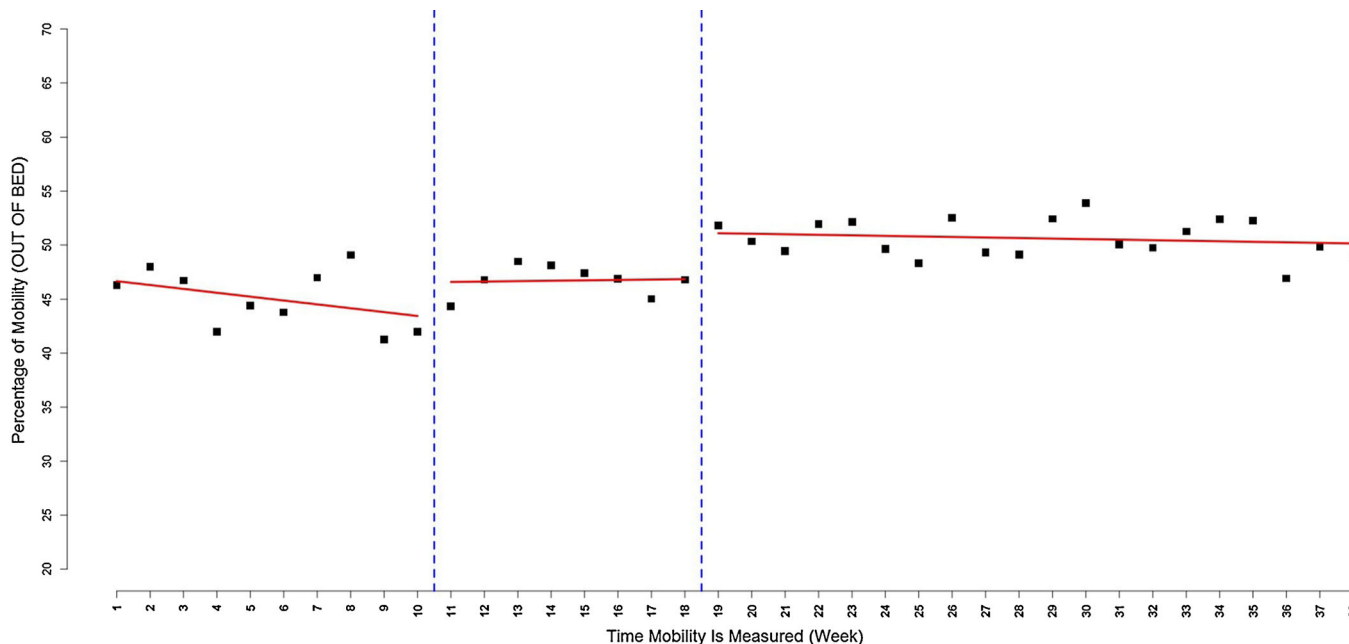
MOBILIZATION OF VULNERABLE ELDERLY IN ONTARIO (MOVE ON): A MULTISITE INTERRUPTED TIME SERIES EVALUATION OF AN IMPLEMENTATION INTERVENTION TO INCREASE PATIENT MOBILIZATION Barbara A. Liu^{1, 2}; Julia E. Moore³; Ummukulthum Almaawiy¹; Wai-Hin Chan³; Sobia Khan³; Jemila Hamid³; Jocelyne Ewusie⁴; Sharon Straus³. ¹Regional Geriatric Program of Toronto, Toronto, ON, Canada; ²Sunnybrook Health Sciences Centre, University of Toronto, Toronto, ON, Canada; ³Li Ka Shing Knowledge Institute of St Michael's, University of Toronto, Toronto, ON, Canada; ⁴McMaster University, Hamilton, ON, Canada. (Tracking ID #2194865)

BACKGROUND: Older patients admitted to hospital are at risk for hospital-acquired morbidity related to immobility. During hospitalization, older patients spend a median of 4 % of the day out of bed. Bed rest is associated with multiple complications including delirium, decubitus ulcers, venous thrombosis, pneumonia, and muscle atrophy. One of the most profound and immediate effects of bed rest is the loss of muscle strength. Each day spent immobile is associated with 1 to 5 % loss of muscle strength. In a vulnerable senior, this can quickly result in the loss of ability to transfer and ambulate independently, key functional abilities required for return to living in the community. The objective of this project was to implement and evaluate the impact of an evidence-informed strategy to promote early mobilization and prevent functional decline in older patients admitted to hospitals in Ontario.

METHODS: We used an interrupted time series design to evaluate the impact of the intervention over the course of 3 time periods—pre-intervention (10 weeks), during intervention (8 weeks) and post-intervention (20 weeks). The study took place in 14 hospitals in Ontario, Canada and included patients aged 65 years and older who were admitted to inpatient medicine units between January 2012 and December 2013. The early mobilization implementation strategy was multi-component and tailored to the local context, but all hospitals implemented three core messages: 1) patients should be assessed for mobilization status within 24 h of admission; 2) mobilization should occur at least three times a day; 3) mobilization should be progressive and scaled. The primary outcome was patient mobility assessed by visual audits of “out of bed” status. Secondary outcomes included length of stay, discharge destination, falls and functional status.

RESULTS: Thirteen thousand five hundred eighty-three patients (mean age 79.9 years (SD=8.32) participated. Compared to pre-intervention, during the intervention 3.12 % more patients were out of bed per day (slope change=0.40 % (95 % CI: [-0.32, 1.11]) compared to pre-intervention). After the intervention, mobilization continued to increase (slope change=0.31 %, 95 % CI: [-0.13, 0.75], compared to pre-intervention) with 10.56 % (95 % CI: [4.94, 16.18]; $p=0.0002$) more patients out of bed per day at the end of the study period compared to pre-intervention. Median length of stay post-intervention was 6.1 (95%CI: [-11, -1.2]; p -value=0.0147) days shorter than pre-intervention.

CONCLUSIONS: This is the first large scale study to evaluate an early mobilization knowledge translation strategy in older, general medical patients. The positive outcome of this educational intervention on an important functional goal of getting more patients out of bed is a striking success for improving care for hospitalized older patients. Several factors likely contributed to the success of this intervention, including: tailoring the intervention to local context; using implementation coaches; and planning for sustainability.



Weekly visual audit results for out of bed status

MODELING INDIVIDUAL (RATHER THAN SOCIETAL) PREFERENCES FOR COLORECTAL CANCER SCREENING Glen B. Taksler, Cleveland Clinic, Cleveland, OH. (Tracking ID #2197834)

BACKGROUND: Colorectal cancer screening is generally recommended for individuals aged 50–75 years. From a societal perspective, there are large benefits, about 200–270 life-years gained per 1000 persons screened. On average, each person gains 2–3 months of life expectancy. However, gains are not evenly distributed, as most individuals experience negligible harm (due to discomfort of test preparation), a few individuals gain many years and the rare individual experiences serious harm. The optimal screening strategy for an individual depends on how s/he values these different outcomes based on attitudes toward risk. We devised a model to recommend personalized colorectal cancer screening strategies based on individual preferences.

METHODS: We modeled a hypothetical individual's decision to screen for colorectal cancer, based on his/her individual preferences, rather than societal goals. Every year, the individual could choose between screening and not screening for disease using 3 methods: colonoscopy, flexible sigmoidoscopy, or fecal occult blood testing (FOBT). An individual who screened realized a large probability of no change in life-years (associated with a negative screening test, or positive screening test with late diagnosis), a small probability of additional life-years (associated with early diagnosis), and a small probability of screening test complications. An individual who did not screen realized no change in survival probabilities. Risk preferences were assessed by simulating the increase in life expectancy that an individual would require to accept the potential for serious harm from screening (defined as perforation, hemorrhage, other events requiring hospital admission, or death from colonoscopy or flexible sigmoidoscopy; minimal risk from FOBT). Each pattern was informed by baseline life expectancy, obtained from national life expectancy tables. We then estimated expected lifetime utility by summing the probability distributions for life-years survived in each scenario, each multiplied by individual utility as a function of remaining life expectancy. Using data from the Surveillance, Epidemiology, and End Results (SEER) survey between 2000–2011, we estimated expected utility for combinations of screening method, frequency, start and stop ages (colonoscopy, every 1–20 years; flexible sigmoidoscopy, every 1–10 years; FOBT, every 1–3 years; start age, 20–75 years, stop age, 20–75 years) as compared with no screening, and rank-ordered results, to help understand how individual preferences impact screening decisions. Sensitivity analyses extended the maximum allowable age of screening cessation to 85 years.

RESULTS: For an average-risk individual whose preferences mirrored those of guideline-recommended care (requiring only actuarial gains in life expectancy to be willing to undergo screening—about 2 months for colonoscopy), the model predicted that s/he would choose to undergo colonoscopy every 11 years, from age 53–75 years, nearly identical to national guidelines. However, for a similar individual who was moderately

risk-averse (requiring a 4-month increase in life expectancy to be willing to accept the potential risks of colonoscopy), the model predicted that s/he would prefer to undergo colonoscopy every 14 years, still obtaining 3 lifetime colonoscopies, but over a longer time period than currently recommended. For an individual with higher risk aversion (7-month required increase in life expectancy), the model predicted that s/he would prefer to undergo just 2 lifetime colonoscopies, at ages 52 and 72 years. Biannual FOBT was predicted in individuals at high-risk of screening-related complications, such as bleeding from polypectomy for patients with severe systemic disease. Therefore, although informed individuals may screen less-often than guideline-recommended, they still should choose to obtain voluntary, regular screening. By contrast, for an individual who poorly understood the benefits of early detection (such as incorrectly assuming that a 2–3 month increase in life expectancy would occur with certainty, rather than a larger benefit with cancer diagnosis and minimal-to-no benefit without cancer diagnosis), the model predicted that s/he would prefer triennial FOBT or no screening, depending on risk aversion.

CONCLUSIONS: Quantitative models might help individualize colorectal cancer screening based on patient preference. Future research should consider the potential of such recommendations to improve patient adherence, and how to reduce the gap between individual-preferred vs. guideline-recommended frequency.

MOTIVATIONAL INTERVIEWING IMPROVES MEDICATION ADHERENCE

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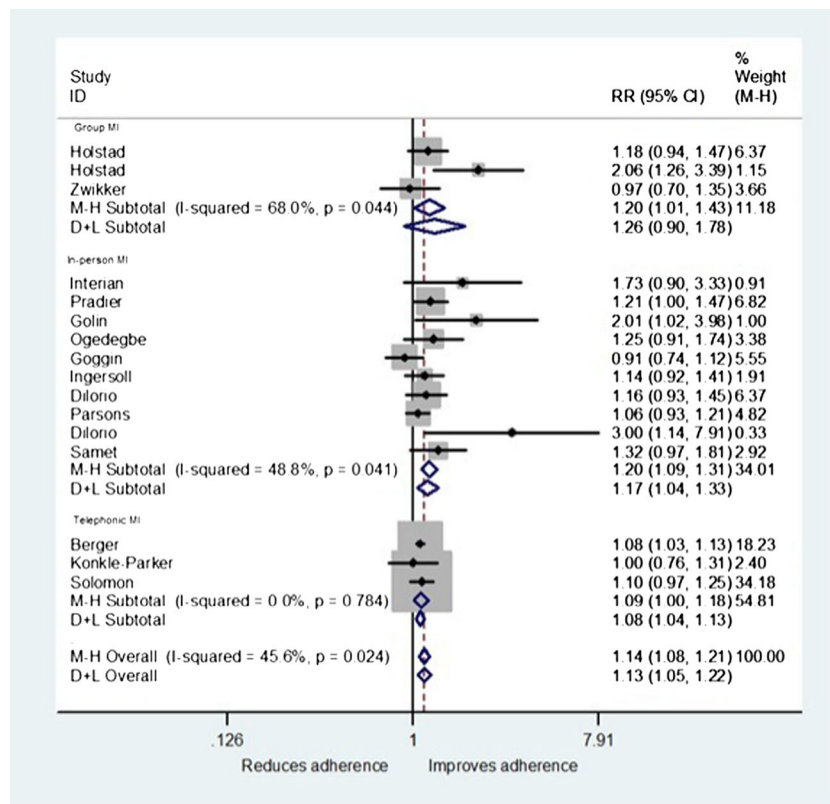
BACKGROUND: Motivational Interviewing (MI) is among the few interventions reported to improve adherence that can be easily disseminated. To determine the effect of MI on adherence to medications and the impact that delivery format, length, and intensity of the intervention have on objective and subjective measures of adherence.

METHODS: We searched the MEDLINE database for studies published from 1966 until September 2014. We conducted manual searches of bibliographies of key relevant articles. We included randomized trials that compared MI to one or more control groups and reported a numerical measure of medication adherence. Two pairs of reviewers abstracted data on previously developed tables and used the CONSORT form to evaluate quality. The main outcome was medication adherence defined as any subjective or objective measure reported as the percentage of subjects adherent at 80 % or higher.

RESULTS: We included 16 studies that randomized 1123 subjects into the MI arm and 900 subjects to the control group. The RR of being adherent for MI was 1.13; (95 % CI 1.05–1.22) when compared to a control. Comparing MI delivered in different formats (figure) against the control group, the RR of being adherent was 1.17; (95 % CI 1.04–1.33)

for in person individual MI, 1.14; (95 % CI 1.08–1.21) for telephonic MI and 1.26; (95 % CI 0.90–1.78) for group MI. The impact on adherence was more consistent for interventions with 6–12 months of follow up and those with 4–6 MI encounters ($p < 0.01$).

CONCLUSIONS: MI delivered in person or by phone successfully improves medication adherence. Studies that compare different targeting and delivery approaches in real world settings are needed.



MULTIMORBIDITY AND MORTALITY IN COMMUNITY-DWELLING WOMEN: SIMPLE DISEASE COUNTS, THE CHARLSON INDEX, AND A NOVEL MULTIMORBIDITY WEIGHTED INDEX Melissa Y. Wei^{1,2}; Kenneth Mukamal^{1,2}.
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BACKGROUND: The Charlson comorbidity index was developed and validated to predict inpatient mortality and is one of the most cited methods for comorbidity adjustment in hospital, clinic, and population-based research studies. We developed and internally validated a Multimorbidity Weighted Index (MWI) that weights 81 chronic diseases and conditions by their impact on physical health-related quality of life (HRQOL) in three large cohorts of community-dwelling adults, the Nurses' Health Study (NHS), NHS II, and Health Professionals Follow-up Study (HPFS). Diseases varied several-fold in their impact on physical HRQOL. We assessed the criterion validity of the Multimorbidity Weighted Index and compared it with other metrics for mortality prediction in the NHS and HPFS cohorts of middle-aged and older adults. Our index provided the best fitting model and had excellent discrimination for 10-year mortality prediction compared with the Charlson index and simple disease count. Our current study extends prior work by examining the MWI and mortality prediction in young and middle-aged women.

METHODS: NHS II is a prospective cohort of 116,686 female nurses aged 25–42 years when participants enrolled in 1989. We included NHS II participants who completed a questionnaire in 2001 on physician-diagnosed diseases and conditions and had complete follow-up through December 31, 2010. The Multimorbidity Weighted Index, disease count, and Charlson index were examined as continuous and categorical variables. Incident rate ratios for models with the best performance (minimum Akaike Information Criterion, AIC) were estimated using Cox proportional hazards modeling. To quantify how accurately the model discriminates between survival outcomes, we computed the concordance (C) statistic for survival analysis, where 0.5 indicates discrimination due to chance, and 1 indicates perfect discrimination. The Cox proportional hazards assumption was not violated based on Schoenfeld residuals.

RESULTS: In 2001, 95,122 participants had a mean age of 46 (SD 5) years, multimorbidity index of 2.9 (median 1.8, range 0–35), disease count of 2.2 (median 2.0,

range 0–18), and Charlson index of 0.20 (median 0, range 0–7). After follow-up, 1260 (1.3 %) deaths occurred. The Multimorbidity Weighted Index spanned the widest distribution of multimorbidity. Eighty-seven percent of adults had a Charlson index of 0 compared with 20 % of adults with a multimorbidity index and disease count of 0. Participants with the highest quartile multimorbidity index had nearly quadruple the hazard rate of mortality than those in lower quartile (Hazard Ratio, HR 3.95, 95 % CI: 3.23–4.41, p-trend <0.0001). The HR was 3.33 (95 % CI: 2.74–4.04, p-trend <0.0001) for the highest vs. lowest quartile of disease count. For the Charlson index, the hazard ratio could only be computed for the highest decile versus all other deciles: HR 4.48 (95 % CI: 4.00–5.01, p<0.0001). The multimorbidity index yielded the minimum AIC (AIC 28403 quartiles, 28313 linear) compared with disease count (AIC 28489 quartiles, 28363 linear). The C-statistics for quartiles of mortality were marginally higher for the multimorbidity index (0.69, 95 % CI: 0.67–0.71) compared with disease count (0.67, 95 % CI: 0.65–0.70). The multimorbidity index was only moderately correlated with Charlson (Pearson $r=0.44$) and strongly but not perfectly correlated with disease count ($r=0.87$).

CONCLUSIONS: In this cohort of over 95,000 young and middle-aged women, the Multimorbidity Weighted Index and disease count were applicable across a wide distribution of multimorbidity. The multimorbidity index was significantly associated with 9-year mortality and provided the best-fitting model and discrimination compared with disease count. In contrast, 87 % of participants did not have a Charlson index. While the Charlson index accurately predicted mortality, its use was limited to the few participants with a calculable Charlson index. Thus, the Multimorbidity Weighted Index may be a more appropriate method for mortality prediction and risk-adjustment in this sample of women with increased mortality risk from diseases and conditions captured in the multimorbidity but not Charlson index. Our easily computed and implemented Multimorbidity Weighted Index was sensitive to the accumulation and severity of diseases with increased mortality, which may enable earlier opportunities to intervene in multimorbidity progression in young and middle-aged community-dwelling adults.

MUSLIM PATIENTS AND HEALTH CARE UTILIZATION DURING RAMADAN Nadaa Ali¹; Harry Reyes Nieva²; Sanja Percac-Lima³; Helen M. Shields¹; Jeffrey A. Linder¹; Nora Osman². ¹Brigham and Women's Hospital, Boston, MA; ²Brigham and

Women's Hospital/Harvard Medical School, Boston, MA; ³Massachusetts General Hospital, Chelsea, MA. (Tracking ID #2191681)

BACKGROUND: During the month-long fast of Ramadan, Muslims abstain from food and water from sunrise to sunset. Whether clinicians counsel Muslim patients about fasting during Ramadan, and whether fasting during this month, increases healthcare utilization has not been previously examined. To describe demographic differences between Muslim and non-Muslim primary care patients; to measure rates of counseling and health care utilization for Muslim patients during Ramadan compared to non-Muslim patients.

METHODS: We conducted a retrospective review of Partners HealthCare billing and electronic medical records of Muslims and non-Muslims who made at least one primary care visit during Ramadan or the month prior from 2008 through 2013. We measured the rates of primary care visits, emergency department (ED) visits, and hospitalizations during Ramadan. To assess rates of counseling about fasting during Ramadan, we conducted text analysis of physician notes to detect mention of Ramadan or Muslim faith during and within 30 days of the start of Ramadan. To evaluate the independent association of Muslim faith with health care utilization during Ramadan, we used multivariate negative binomial regression models adjusted for patient factors and baseline visit rates.

RESULTS: There were 2069 Muslim and 128,916 non-Muslim patients during the study period. Muslim patients were younger (mean age 44 versus 51 years); less educated (10 % had an 8th grade education or less versus 4 %); less often commercially insured (81 versus 91 %); and more likely to have Medicaid (17 % versus 4 %; $p < 0.0001$ for all comparisons). The prevalence of diabetes was significantly higher in Muslims (14 % versus 12 %; $p = 0.003$). The primary care visit rate for Muslim patients was 1394 per 1000 patients the month before Ramadan and 1361 per 1000 during Ramadan ($p = 0.39$). Hospitalization rates for Muslim patients were 77 per 1000 patients the month before Ramadan and 84 per 1000 patients during Ramadan, respectively ($p = 0.43$). For Muslim patients, the ED visit rate was 49 per 1000 patients the month before Ramadan and 46 per 1000 patients during Ramadan ($p = 0.70$). In multivariate models, during Ramadan, Muslims had a higher rate of primary care visits (odds ratio [OR], 1.05; 95 % confidence interval [CI], 1.03–1.08), ED visits (OR, 1.68; 95 % CI, 1.44–1.95), and hospitalizations (OR, 1.23; 95 % CI, 1.07–1.41) compared to non-Muslims during Ramadan. For Muslim patients, mention of Ramadan or Muslim faith in primary care visit notes was low (2 %) the month prior to Ramadan and increased to 5 % during Ramadan ($p < 0.0001$).

CONCLUSIONS: Muslims were more likely to visit primary care physicians, the ED, or hospital during Ramadan. Clinicians mentioning Ramadan or Muslim faith increased during Ramadan, but it remained very low. Efforts to decrease healthcare utilization during Ramadan and improve care for Muslims require further analysis, physician and patient education, and potentially health system and public health interventions.

Patient Demographics

Characteristic	Overall (n = 130,985)	Non-Muslim (n = 128,913)	Muslim (N = 2069)	P-Value
	Mean (Standard Deviation)			
Age, years	51 (17)	51 (17)	44 (15)	<.0001
Gender				0.0417
Women	83,077 (63)	81,809 (63)	1268 (61)	
Men	47,908 (37)	47,107 (37)	801 (39)	
Race/Ethnicity				<.0001
White	89,606 (68)	88,567 (69)	1039 (50)	
Latino	20,392 (16)	20,378 (16)	14 (1)	
Black	12,876 (10)	12,357 (10)	519 (25)	
Asian	5567 (4)	5364 (4)	203 (10)	
Other	254 (2)	2250 (2)	294 (14)	
Insurance				<.0001
Private	119,531 (91)	117,845 (91)	1686 (81)	
Medicaid	5424 (4)	5078 (4)	346 (17)	
Medicare	87 (0)	87 (0)	0 (0)	
Self-Pay	2052 (2)	2023 (2)	29 (1)	
Unknown	3891 (3)	3883 (3)	8 (0)	
Primary Language				<.0001
English	103,634 (79)	102,385 (79)	1249 (60)	
Other	27,351 (21)	26,531 (21)	820 (40)	
Marital Status				<.0001
Married	66,123 (50)	64,726 (50)	1397 (68)	
Single	44,634 (34)	44,205 (34)	429 (21)	
Divorced	8503 (6)	8398 (7)	105 (5)	
Widowed	7213 (6)	7125 (6)	88 (4)	

(continued)

Separated	1886 (1)	1851 (1)	35 (2)
Partnered	288 (0)	287 (0)	1 (0)
Unknown	2338 (3)	2324 (2)	14 (1)
Education			<.0001
Completed College/ Graduate School	51,575 (39)	50,917 (39)	658 (32)
Some College/ Vocational/ Technical School	17,929 (14)	17,666 (14)	263 (13)
High School/ General Equivalency Diploma	23,919 (18)	23,336 (18)	583 (28)
Some High School	5230 (4)	5119 (4)	111 (5)
8th Grade or Less	5809 (4)	5601 (4)	208 (10)
Unknown	492 (0)	246 (0)	246 (12)

NATIONAL ESTIMATES OF DISPARITIES IN AMBULATORY CARE SENSITIVE CONDITION HOSPITALIZATIONS AMONG HISPANICS Chen Feng²; Nancy R. Kressin^{2, 3}; Michael Paasche-Orlow⁴; Lenny Lopez¹; Jennifer E. Rosen⁵; Amresh D. Hanchate^{2, 3}. ¹Harvard University, Boston, MA; ²Boston Medical Center/ Boston University School of Medicine, Boston, MA; ³Dept of Veterans Affairs and Boston University, West Roxbury, MA; ⁴Boston University, Boston, MA; ⁵MedStar Washington Hospital Center, Washington, DC. (Tracking ID #2197901)

BACKGROUND: Hispanics, the largest minority nationally, are at higher risk of inadequate access to healthcare, due to relatively higher rates of uninsurance compared to (non-Hispanic) whites and blacks. However, limits in national data, including misreporting Hispanic ethnicity, have restricted research on access barriers based on actual health care utilization. With a view to develop a national estimate of disparities in access barriers among Hispanics, relative to whites and blacks, we pooled comprehensive inpatient administrative data from 15 states containing over 85 % of the national Hispanic population. Following the Agency for Healthcare Research & Quality (AHRQ), we estimated the prevalence of admissions for ambulatory care sensitive conditions (ACSCs), including heart failure, pneumonia, and diabetes, as an indirect measure of access barriers to timely and good quality outpatient care.

METHODS: We identified the 15 states—Arizona, California, Colorado, Florida, Massachusetts, Maryland, Nevada, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Texas, Virginia and Washington—based on the size of Hispanic population and completeness of patient race/ethnicity data, and obtained comprehensive inpatient administrative data for 2010–2011. We pooled these data and identified admissions with the principal diagnosis of one of the 12 ACSCs relating to adults aged 18 and older in accordance with the AHRQ Prevention Quality Indicators (PQI) protocol. Data on counts of ACSC admissions and census population, stratified by state, race/ethnicity, age, and sex were used to estimate ACSC admission rates per 100,000 population by direct standardization. We further adjusted for socioeconomic status (SES)—using zip code median income—and county-level indicators of provider availability using Poisson regression models, and obtained relative rates of ACSC admissions among Hispanics and blacks relative to whites, expressed in terms of the incidence rate ratio [IRR]. In addition, to examine heterogeneity among Hispanics, we compared prevalence rates by national origin grouped into four categories: Mexican, Puerto Rican, Cuban and Others.

RESULTS: We identified 3,631,028 ACSC admissions by patient race/ethnicity: Hispanics (13 %), blacks (16 %), whites (64 %), others (5 %) and missing (2 %). The most common ACSCs were heart failure (22 %), chronic obstructive pulmonary disorder (20 %) and pneumonia (18 %); this pattern was similar across race/ethnicity. Crude ACSC admission rates for Hispanics were higher than among whites, but lower than among blacks, in all 15 states. Adjusting for age, sex and state, the overall ACSC admission rate among Hispanics (1427 per 100,000 population; IRR 1.11, 95 % CI [1.07, 1.14]) was higher than among whites (1269). However, after additional adjustment for indicators of SES and provider availability, this disparity was reversed, with lower relative rates among Hispanics (IRR 0.96, 95 % CI [0.93, 0.98]). In contrast to Hispanics, ACSC rates were consistently higher among blacks, relative to whites, across both models. Among Hispanics, Cuban Hispanics had the highest ACSC rate, and the other nationality groups had similar rates.

CONCLUSIONS: Based on near-national data for Hispanics, we found that crude rate of ACSC admissions among Hispanics was 11 % higher compared to whites, and this difference was largely mediated by differences in socioeconomic status and provider

availability. In contrast, both crude and adjusted ACSC rates for blacks were higher compared to whites. **Keywords:** Hispanics, disparity, race, ethnicity, ambulatory care sensitive conditions

NATIONAL TRENDS IN PRIMARY CARE VISITS BY OLDER ADULTS AT SAFETY NET SITES, 2006–2010 Anna H. Chodos^{1, 3}, Kanan Patel¹, W. John Boscardin¹, Christine Ritchie², ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³UCSF, SFGH, San Francisco, CA. (Tracking ID #2198726)

BACKGROUND: Socioeconomically disadvantaged adults aged 65 and older (“older adults”) are a growing demographic. Safety net settings are an important source of care for this population, and may experience increasing demand for care from this demographic. We describe recent trends and characteristics of older adults’ visits in safety net primary care to understand the potential impact of growing health care demand from this demographic in this sector.

METHODS: Using nationally-representative annual survey data, the National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, we examined the number of primary care visits among adults seen at safety net sites, which includes community health centers and safety net hospital outpatient departments. We defined primary care as ambulatory care visits to any physician or mid-level provider in general medicine, general practice, internal medicine, or family medicine. We compared utilization in older adult age groups (≥65) to those of middle-age (45–64) and younger adults (18–44) using a linear trend test. We also describe characteristics of visits, including among older adult subgroups by age (65–74, 75–84, 85+). Survey data were analyzed with established survey weights.

RESULTS: From 2006 to 2010, older adults’ visits accounted for 17.9 % of all visits among adults ≥18. Adults 85 and older accounted for 1.7 % of all visits. For trends among adult age groups, see Table 1 showing visits by year. There were no significant trends in patient characteristics associated with visits in the 5-year period. However, we present selected characteristics by age group in a representative year, 2010. Table 2 shows that older adults in all age subgroups have a higher prevalence, compared to adults 18–44 and 45–64, of living in a rural area; having Medicare or Medicare and Medicaid; not being a current smoker; having more chronic conditions; having 6 or more visits in the last year (i.e. frequent visits); and being seen for a chronic condition.

CONCLUSIONS: Primary care visits among older adults at safety net sites, including those 65 and older, was stable from 2006 to 2010, and there were no clear trends in demographic or visits characteristics among older age subgroups. However, they represent a distinct group compared to younger adults (<65 years) in that they are sicker, use visits more frequently and for chronic care. As numbers of older adults with socioeconomic disadvantage increase, particularly after 2011 due to the aging of the baby boomer cohort, more may seek care at safety net sites and this trend should be monitored to inform resource allocation.

Table 1: Primary care visits at safety net sites, 2006–2010

No. in thousands	2006 N=	2007 N=	2008 N=	2009 N=	2010 N=	Total N=	p-value for linear trend
≥65 yo	42482	44328	53614	11932	50348	250365	0.16
18–44	19.0 %	19.7 %	18.3 %	15.4 %	18.0 %	17.9 %	0.95
45–64 yo	39.7 %	39.5 %	39.2 %	40.7 %	39.1 %	39.7 %	0.29
18–44	41.3 %	40.8 %	42.5 %	43.9 %	42.9 %	42.4 %	

Table 2: Patient visit characteristics by age group, 2010

	18–44 yo N=21586	45–64 yo N=19705	65–74 yo N=5311	75–84 yo N=2937	85+ yo N=809
Female	67.2 %	57.9 %	61.5 %	64.5 %	77.3 %
Non-hispanic, white	45.0 %	48.0 %	54.3 %	65.2 %	68.2 %
Current tobacco use	34.1 %	36.1 %	16.7 %	9.6 %	2.6 %
Rural residency	18.6 %	20.9 %	29.3 %	38.1 %	42.3 %
Insurance: Medicare	3.4 %	10.5 %	59.2 %	71.5 %	77.1 %
Insurance: Medicaid	38.9 %	27.3 %	8.6 %	5.2 %	2.3 %
Insurance: Medicaid+ Medicare	1.5 %	5.1 %	10.8 %	12.8 %	11.9 %
Total no. of chronic conditions, mean (95 % CI)	0.8 (0.7–0.9)	2.0 (1.8–2.1)	2.6 (2.4–2.9)	2.5 (2.3–2.8)	2.8 (2.3–3.3)
History of 6 or more visits in last year	27.0 %	34.5 %	40.4 %	42.5 %	35.2 %
Reason for visit: chronic illness	30.7 %	52.0 %	58.2 %	62.3 %	51.0 %

NEED TO REBOOT? RETENTION OF PATIENT-CENTERED EMR USE SKILL Wei Wei Lee; Lolita Alkureishi; Jeanne M. Farnan; Vineet M. Arora. University of Chicago, Chicago, IL. (Tracking ID #2196169)

BACKGROUND: Studies demonstrate that Electronic Medical Record (EMR) use in exam rooms can be detrimental to patient-doctor communication. Despite rapid EMR adoption, few providers receive formal EMR-based communication skills training. Our aims are to 1) Evaluate retention of patient-centered EMR use skills one year after curricular intervention 2) Compare Observed Structured Clinical Exam (OSCE) performance of second-year medical students (2013-MS2s) who received training in 2013 to their subsequent performance as third-year students (2014-MS3s) and 3) Compare OSCE performance of 2014-MS3s, who received training, to 2013 MS3 students (2013-MS3s), who received no formal training.

METHODS: In 2013, MS2s received a 1-hour patient-centered EMR use lecture and participated in a group OSCE (1 student interacted with Standardized Patient (SP), 3 observed). The OSCE was repeated in 2014 for all MS3s who received training as MS2s. A historical control group of 2013 MS3 who did not receive training also completed the OSCE. We compared OSCE performance of 17 students with paired 2013-MS2 and 2014-MS3 data. OSCE performance of 2014-MS3s ($n=83$), who received training as MS2s, was compared to 2013-MS3s ($n=88$) who received no training.

RESULTS: Using a 16 item checklist (range: 15–80), standardized patient (SP) ratings of students ($n=17$) showed significantly lower performance 1 year after MS2 training [73.4 (SD=4.7) v. 60.8 (SD=14.8), $p=0.001$; average change score from 2013 to 2014= -12.6 (SD 13.3)]. SP ratings of 2014-MS3s ($n=83$) who received training 1 year ago, were not statistically different from the historical control group of 2013- MS3s ($n=88$) who received no training [60.8 (SD=13.4) vs 58.1 (SD=13.1)].

CONCLUSIONS: One year after receiving patient-centered EMR use training, students’ performance deteriorated to a level that was indistinguishable from a historical control group that received no training. These findings may reflect negative role-modeling from residents and faculty and support the need for continued training during third year for sustained change in practice.

NET HARMS OF AGGRESSIVE BLOOD PRESSURE CONTROL ON CARDIOVASCULAR EVENTS AND FALL INJURY IN OLDER AMERICAN ADULTS Lillian Min^{1, 4}, Eve A. Kerr³, Deborah A. Levine¹, Kenneth M. Langa^{1, 5}, Caroline Blaum², Timothy Hofer³, ¹University of Michigan, Ann Arbor, MI; ²New York University, New York, NY; ³University of Michigan and VA Center for Clinical Management Research, Ann Arbor, MI; ⁴Ann Arbor VA Medical Center, Ann Arbor, MI; ⁵Ann Arbor VA Medical Center, Ann Arbor, MI. (Tracking ID #2199448)

BACKGROUND: Treating systolic blood pressure (BP) of 150 mmHg with multiple medications prevents cardiovascular events and death. However, modest antihypertensive medication use is associated with an increase in fall injury risk. It is unclear whether the harms outweigh the benefits, and whether the net effects vary by degree of BP control. We aimed to quantify the net effect of increasingly aggressive hypertension control (AHC) on cardiovascular benefit versus fall-related harm in a nationally-representative sample.

METHODS: Longitudinal study of 5518 participants of the Health and Retirement Study (HRS) aged 65 or older with self-reported hypertension and taking BP medications, and who had BP measured at baseline by an enhanced HRS exam in 2008 or 2010 (two randomly-assigned, mutually exclusive cohorts). The sample was categorized by increasing AHC: (1) **untreated** SBP ≥160 mmHg, (2) **poorly controlled** and treated SBP ≥160 mmHg, (3) **adequate control**, defined as treated SBP 121–159 mmHg or untreated SBP 140–159 mmHg, and (4) **overly aggressive** SBP treated to <120 mmHg. The 120 and 160 mmHg cutoffs ensured that the over-and under-control groups were truly different from 140 mmHg. We determined the effect of AHC over a 2-year follow-up (2008–10 or 2010–12) on incidence of self-reported fall injury requiring medical care, acute stroke, myocardial infarction, and acute heart failure. We used multinomial logistic regression to consider fall injury only, any cardiovascular (CV) outcome, and both fall and CV outcome (compared to neither outcome), controlling for age at baseline and sex, to calculate net absolute changes in risk across increasing levels of AHC. We considered AHC classes first as a numeric predictor (where greater=more aggressive) and second as a categorical predictor. We calculated net effect of increasing AHC from one category to the next higher category, in units of absolute percentage points, with bootstrapped confidence intervals (95 %) around the net effect to determine statistical difference from zero.

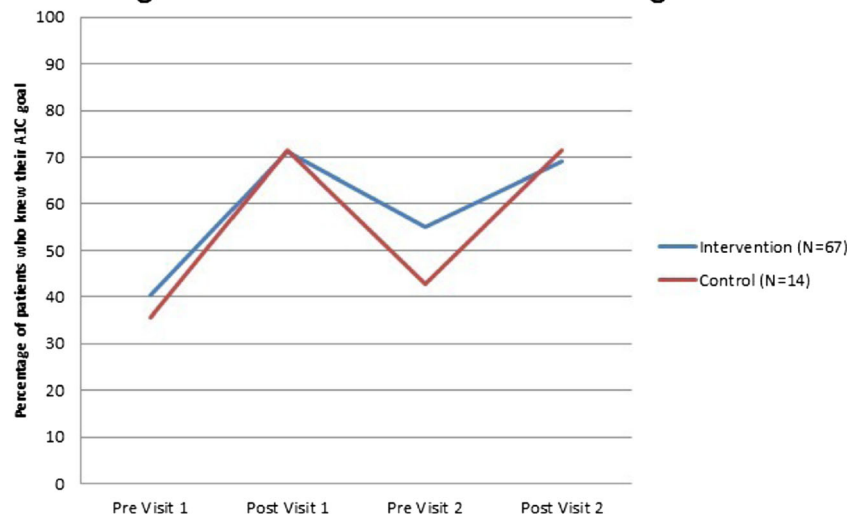
RESULTS: Two-year incidence of fall injury (11 % overall) increased with age and was more prevalent than any CV event (5 % overall). Most of the sample ($n=3676$, 66 %) was classified in group 3 (BP 120–160 mmHg). Group 4, the over controlled group with BP < 120 mmHg, included $n=1037$ (19 %). The poorly controlled groups 1 and 2 were small ($n=223$ [4 %] and $n=582$ [11 %], respectively). When we considered AHC as a continuous predictor (greater=more aggressive), **per level of AHC increased risk of fall**

injury (RR 1.15 [95 % CI 1.0-1.3]), but not cardiovascular events (RR=1.08 [.81–1.44]) or both (RR=1.33 [.94–1.9]). When net harm was considered across advancing age, net harm was associated with group 4 (<120 mmHg) compared to group 3 (BP 120–160 mmHg). The net harm associated with overly-treated BP ranged from 2 absolute %-points at age 65, increasing to 10 absolute %-points at age 85, with net harm statistically different from zero above the age of 73 (Figure), mostly due to fall injury.

There were no differences in net benefit or harm between group 3 (120–160 mmHg) compared to the poorly-controlled groups (1 and 2).

CONCLUSIONS: Aggressiveness of BP control should be individualized by patient to steer clear of net harm, especially for older adults at advanced ages. Those with overly-controlled BP and at risk of net harm should be considered for de-escalation.

Figure 1: Patients who know their A1C goal



NON-MEDICAL USE OF PRESCRIPTION OPIOIDS AND EMERGENCY DEPARTMENT UTILIZATION: RESULTS OF A NATIONAL SURVEY Joseph W. Frank^{1, 2}; Ingrid A. Binswanger^{1, 3}; Susan L. Calcaterra¹; Cari Levy². ¹University of Colorado Denver, Denver, CO; ²VA Eastern Colorado Health Care System, Denver, CO; ³Kaiser Permanente Colorado, Denver, CO. (Tracking ID #2197865)

BACKGROUND: Drug overdose is the leading cause of accidental death among adults in the United States, and a majority of all prescription drug overdose deaths involve non-medical use (NMU) of prescription opioids. From 2004 to 2008, Emergency Department (ED) visits related to NMU of opioids increased by 111 %. ED-based interventions have shown promise in the treatment of alcohol use disorders, but little is known about the potential role of ED-based interventions to screen for and treat NMU of opioids. We sought to examine trends and correlates of ED utilization among a nationally representative sample of adults who report NMU of prescription opioids.

METHODS: We conducted a serial cross-sectional analysis of the 2008–2013 National Survey on Drug Use and Health (NSDUH), a nationally representative survey of the non-institutionalized U.S. civilian population (N=228,556). We identified adult respondents (age ≥18) with self-reported past year NMU of prescription opioids, defined as use of a prescription pain medication “that was not prescribed for you or that you took only for the experience or feeling it caused”. We examined the association between past year NMU of prescription opioids and self-reported past year ED utilization. Among adults reporting past year NMU of opioids, we examined sociodemographic and clinical correlates of past year ED utilization. Specifically, we assessed the following attributes of NMU of opioids: frequency of past year NMU (1–29 days, 30–99 days, 100–199 days, 200–365 days), source of prescription opioids (1 or more physicians, all other sources) and past year opioid withdrawal symptoms (Yes, No). We used the chi-square test to examine bivariate associations and multivariable logistic regression to adjust for sociodemographic characteristics, self-reported health status and other co-occurring substance use disorders. All analyses were conducted using SAS version 9.3.

RESULTS: In the United States, an estimated 10.5 million adults reported past year NMU of opioids, representing 4.6 % of U.S. adults. Past year ED utilization was more common among adults with past year NMU of opioid compared to the general population (39 % vs. 27 %, $P < .001$). Adults reporting past year NMU of opioids accounted for an estimated 9.4 million annual ED visits, representing 7.3 % of all annual ED visits. In a multivariable logistic regression model, past year NMU of opioids was significantly associated with past year ED utilization (odds ratio [OR] 1.37, 95 % confidence interval [CI] 1.30–1.44). By comparison, past year alcohol use disorder (OR 1.07, 95 % CI 0.95–1.21) and marijuana use disorder (OR 1.07, 95 % CI 0.90–1.26) were not associated with past year ED utilization. Among individuals with past year NMU of opioids, 8 % reported NMU of

opioids on ≥200 days in the past year, 20 % reported one or more physicians as the primary source of opioids, and 14 % reported experiencing opioid withdrawal symptoms in the past year. In a multivariable logistic regression model, independent predictors of past year ED utilization included NMU of opioids on ≥200 days in the past year (OR 1.43, 95 % CI 1.17–1.76) vs. 1–29 days, physician source of opioids (OR 1.87, 95 % CI 1.60–2.19) vs. all other sources, and past year opioid withdrawal (OR 1.67, 95 % CI 1.44–1.95).

CONCLUSIONS: In this nationally representative sample, an estimated 10.5 million adults reported past year non-medical use of prescription opioids, and these individuals accounted for 1 in 13 adult ED visits nationally. ED utilization was more common among individuals reporting more severe NMU of opioids and by those reporting a physician source of opioids. Increased ED utilization may represent patients’ efforts to obtain opioid medications or may result from complications of NMU such as opioid overdose. As pain is not assessed by the NSDUH, the role of acute and chronic pain in both ED utilization and NMU of opioids could not be examined and warrants further study. Interventions to screen for non-medical use of prescription opioids, to facilitate substance use treatment and to prevent opioid overdose death (i.e. naloxone distribution) should consider ED settings given the prevalence and severity of NMU of opioids among ED patients nationally.

OOPS, I DIDN’T NOTICE THAT! PATIENT, PROVIDER, AND SYSTEM FACTORS ASSOCIATED WITH FAILURE TO RECOGNIZE AND FOLLOW-UP ELEVATED RANDOM GLUCOSE VALUES IN AMBULATORY PRACTICE Kazeen Abdullah²; Zahra Merchant²; Riya Joshi¹; Deepa Bhat¹; Jason Fish¹; Ethan Halm¹; Michael E. Bowen¹. ¹UT Southwestern Medical Center, Dallas, TX; ²University of Texas Southwestern Medical Center, Dallas, TX. (Tracking ID #2197803)

BACKGROUND: Random blood glucose (RBG) can identify patients at increased risk for diabetes (DM) and is commonly used as a de facto screen for DM in clinical practice. However, up to 60 % of elevated RBG values in real-world practice go unrecognized, and the reasons for this are poorly understood. This study seeks to characterize patient, provider, and system factors associated with failures to recognize and follow-up elevated RBG values.

METHODS: We conducted a retrospective chart review of non-pregnant adults age ≥18 without diagnosed DM who had ≥1 ambulatory visit at an academic medical center between 1/1/2011 and 12/31/2013. Eligible patients had at least one ambulatory RBG ≥125 mg/dL and no resulted A1C in the 2 years before the RBG value. The RBG threshold was selected based on evidence that RBG values ≥125 mg/dL can identify DM. Of 20411 patients seen during this period, 367 patients met study criteria and 150 were randomly selected. A comprehensive electronic medical record has been used across all care settings

since 2005 and provided all data. We created a data abstraction tool based on a conceptual model of ambulatory clinical errors, and two trained chart abstractors entered data into an electronic database. A 10 % random sample ($n=15$) was reviewed by both abstractors and Kappa calculated. We collected data on patient, provider, and system factors and examined associations with failure to follow-up elevated RBG values using Wilcoxon, chi2, and Fisher's Exact tests as appropriate. Successful follow-up was defined as 1) A1C ordered (30 days); 2) A1C resulted (12 months); 3) comment on the RBG value (30 days); or, 4) result communication to the patient (30 days).

RESULTS: Of 150 charts reviewed, 53 failed to meet study criteria and were excluded for: active cancer in the past 3 years ($n=32$), diagnosed DM ($n=6$), inpatient or ED RBG value ($n=18$). The interrater reliability was Kappa=0.73 ($p<0.002$). The median age was 68 years, 56 % were female, 26 % were non-white, and 59 % had Medicare. Half of elevated RBGs were ordered by medical specialists, 40 % by primary care providers, and 9 % by surgical specialists. Ordering indications included: chronic medical diagnoses (35 %), oncology diagnoses (28 %), gastrointestinal diagnoses (15 %), renal diagnoses (8 %), and health maintenance (7 %). The median (IQR) RBG value was 133 mg/dL (128–148 mg/dL), and 20 % of patients had >1 elevated RBG. Only 36 % of elevated RBG values were followed-up. No differences in follow-up by patient characteristics or ordering provider type were observed (Table 1). Patients on oral steroids were more likely to have their elevated RBG ignored ($p=0.02$). Although 100 % of RBG values were viewed by ordering providers according to electronic time stamps, a trend towards successful follow-up was seen in values viewed sooner (3 vs. 5 days; $p=0.09$). All patients had at least one outpatient visit in the 12 months after the elevated RBG. Those seen sooner by the ordering provider ($p<0.001$) and more frequently ($p=0.07$) were more likely to have the elevated RBG missed. Of follow-up successes, ($n=35$), 71 % of results were communicated to the patient, 57 % of results were commented on, 54 % had DM testing ordered, and 17 % were “caught” by the primary care provider even when they did not order the test. Of results commented on by the ordering provider ($n=20$), 90 % were communicated to the patient; however, 44 % of providers commented that the elevated RBG value was normal. Of resulted A1C values ($n=11$), 55 % were abnormal.

CONCLUSIONS: Failure to recognize elevated RBG values in outpatient practice is common and represents a missed opportunity to identify patients at risk for DM. The lack of patient, provider, and process of care predictors of follow-up suggests that providers largely ignore elevated RBGs regardless of the situation. Systems-based approaches to recognize and communicate elevated RBG results to patients are needed.

Table 1. Patient, Provider, and System Characteristics Associated with Elevated RBG Follow-up.

	Follow-up Success (N=35)	Follow-up Failure (N=62)	p-value
Patient Factors			
Median Age, y, (IQR)	68.8 (55.2–73.4)	67.7 (49.8–76.8)	0.99
Female, (%)	60	53	0.52
Non-White, (%)	31	23	0.34
Median BMI, (kg/m ²), (IQR)	26.2 (21.4–31.4)	26.4 (23.0–29.2)	0.97
Family History of Diabetes, (%)	31	27	0.68
Prediabetes, (%)	6	2	0.30
Hypertension, (%)	54	60	0.61
Hyperlipidemia, (%)	37	34	0.75
Coronary Heart Disease, (%)	14	11	0.75
On steroids, (%)	3	21	0.02
Provider Factors			
Days till reviewed	3 (0–9)	5 (1–31)	0.09
Completed visit with ordering provider in 12 months, (%)	83	82	0.94
Days till next visit with ordering provider	182 (109–259)	84 (33–152)	<0.001
System Factors			
Total visits in 12 months after elevated RBG	6 (3–9)	8 (5–12)	0.07
Primary care visits in 12 months after elevated RBG	2 (1–2)	2 (1–3)	0.12
Number of different providers with completed visits	4 (3–5)	4 (2–6)	0.47

OPIOID PRESCRIBING AFTER NONFATAL OVERDOSE AND ASSOCIATION WITH REPEAT OVERDOSE Marc Laroche^{1,2}, Jane M. Liebschutz¹, Fang Zhang², Dennis Ross-Degnan², James F. Wharam². ¹Boston University School of Medicine and Boston Medical Center, Boston, MA; ²Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, MA. (Tracking ID #2194707)

BACKGROUND: Opioid overdose and overdose death are increasing in the United States. Presentation to an emergency department or hospital with a nonfatal opioid overdose represents an opportunity for identification of opioid misuse and referral for treatment. Opioid prescribing guidelines specify that misuse of opioids and opioid-related adverse events are indications to discontinue long-term opioid therapy. However, patterns of treatment, including rates of continued opioid prescribing, following nonfatal opioid overdose are unknown.

METHODS: We conducted a retrospective cohort study of commercially insured members aged 18–64 years between May 2000 and December 2012 from a large national United States health insurer. We identified 2365 members experiencing an index nonfatal opioid overdose during chronic opioid therapy for non-cancer pain. We identified nonfatal opioid overdose using ICD-9 codes from emergency department or inpatient claims. The primary outcome was reduction in morphine-equivalent dosage of opioids dispensed from the 90 days before to 90 days after the index overdose. We categorized dosage reduction as minimal or none (<25 %), moderate (<25 to 75 %), or large (>75 %). We used standardized provider identifiers to examine the primary prescriber of opioids in the 90 days before and after the index overdose. The secondary outcome was time to repeat opioid overdose with the follow-up period beginning 90 days after the index overdose and censoring for health plan disenrollment, reaching age 65, or end of the study period. We used a propensity score adjusted survival model to determine if dosage reduction was associated with time to repeat overdose.

RESULTS: Ninety percent (2121) of members taking chronic opioids continued to receive opioid prescriptions after a nonfatal opioid overdose. One thousand two hundred sixty-six members (54 %) received no or minimal reduction in opioid dosage following the index opioid overdose, 581 members (25 %) received a moderate dosage reduction, and 518 members (22 %) received a large dosage reduction. We identified a primary prescriber in the pre-and post-overdose periods for 73 % (1541) of members continuing to receive opioids after the index overdose. For 1395 (91 %) of these members, the primary prescriber for the post-overdose period was either the primary (1083; 70 %) or a secondary (312; 20 %) prescriber from the pre-overdose period. Median follow-up time was 1.3 years. A total of 168 members (7 %) experienced a repeat opioid overdose. Compared to members receiving a large dosage reduction (referent), moderate dosage reduction and no or minimal dosage reduction were associated with increased hazard of repeat opioid overdose (adjusted HRs 2.05 [95 % CI 1.18–3.54] and 2.41 [95 % CI 1.46–3.98], respectively).

CONCLUSIONS: Almost all patients taking chronic opioids continued to receive opioid prescriptions after a nonfatal opioid overdose, with more than half receiving the same or higher dosage. Opioid discontinuation or receipt of a large dosage reduction was associated with a significantly lower risk of repeat overdose. Opioid prescribing practices following nonfatal opioid overdose are alarming and might represent health system fragmentation, but provide a major opportunity to improve patient safety.

OPIOID USE WITH MENTAL HEALTH DISORDERS: ARE WE OVER-PRESCRIBING? Brian Halbert, Sarah N. Chiodi, Roger B. Davis, Christina C. Wee. Beth Israel Deaconess Medical Center, Boston, MA. (Tracking ID #2198236)

BACKGROUND: The recent rise in opioid use has led to an increase in overdose deaths, opioid abuse, and medication diversion. Individuals with mental health disorders (MHD) are at higher risk for opioid-related adverse events, but are often over-represented in populations using opioids. Whether this disproportionate use is attributable to a higher prevalence of pain conditions, higher prevalence of opioid use for pain, or a higher transition to long-term opioid use is unclear.

METHODS: We used the nationally-representative Medical Expenditure Panel Surveys (MEPS) to characterize the relationship between MHD, pain conditions, and opioid use from 2006–2011. Individuals with MHD were identified using clinical classification software (CSS) diagnosis codes during the individuals' first year in MEPS. Pain conditions were identified using CCS codes and categorized as acute or chronic. The acute pain category included fractures, tooth and jaw pain, sprains, traumatic joint disorders, and injuries due to external causes. The chronic pain category included osteoarthritis, rheumatoid arthritis, non-traumatic joint pain, back pain, headache, connective tissue disorders, neurologic pain, and generalized pain. We identified individuals who received opioid treatment for these pain conditions using therapeutic class codes, and defined long term opioid therapy as having ≥ 3 opioid prescriptions. We excluded methadone use because of its use in substance abuse disorders. Individuals <18 years old, with cancer, receiving hospice care, or without full follow-up were also excluded. We measured the prevalence of acute pain conditions, chronic pain conditions, and opioid use in year one of MEPS. Among individuals who did not report any opioid use in the first year of MEPS, we estimated the prevalence of new opioid use and chronic opioid use in year two of MEPS. We used logistic regression to compare the prevalence of pain conditions, opioid use, new opioid use, and long-term opioid use between individuals with and without MHD after

considering demographic and socio-economic factors. The final model adjusted for the confounding variables age, race, SF-12 PCS score, SF-12 MCS score, access to usual care provider, and number of additional pain conditions. All analyses were run using SAS 9.3 (Cary, NC) and accounted for the complex survey design of MEPS.

RESULTS: Our sample included 59,865 unique individuals representing an annualized weighted sample of 200,734,038 persons. Of these, 17.5 % had MHD ($n=9611$, weighed sample 35,028,649). Compared to those without MHD, individuals with MHD were older (mean age 46.9 vs 44.3, $p<0.001$) and more likely to be female (63.6 % vs 49.1 %, $p<0.001$). Mean PCS scores (46.7 vs 50.9 $p<0.001$) and MCS scores (43.4 vs 52.5, $p<0.001$) were also significantly lower in the MHD group. The MHD group also had a higher prevalence of white individuals, higher Charlson comorbidity scores, more pain conditions, higher levels of poverty, and higher rates of insurance and access to usual care providers. Education beyond high school was not different between the groups. Individuals with MHD had a significantly higher prevalence of acute pain conditions (20.5 % vs 13.9 %, aOR 1.15 [1.06, 1.24]) and chronic pain conditions (57.0 % vs 31.3 %, aOR 1.87 [1.75, 2.01]). After adjustment, those with MHD were not more likely to use opioids for acute pain conditions (23.3 % vs 20.1 %, aOR 1.02 [0.85, 1.22]). However, individuals with MHD were more likely to use opioids for chronic pain conditions (20.0 % vs 12.2 %, aOR 1.16 [1.03, 1.32]). Among individuals with pain and no prior opioid use, those with MHD were not more likely to initiate opioids for acute pain conditions (15.7 % vs 15.0 %, aOR 1.00 [0.82, 1.22]) or chronic pain conditions (8.7 % vs 7.8 %, aOR 0.96 [0.81, 1.14]). The transition to long-term opioid use after initiating opioids for an acute pain condition was not statistically different in MHD and non-MHD individuals (13.2 % vs 8.1 %, aOR 1.25 [0.65, 2.38]). However, individuals with MHD were more likely to transition to long-term opioid use after initiating opioids for a chronic pain condition (30.3 % vs 17.9 %, aOR 1.53 [1.02, 2.31]).

CONCLUSIONS: Our study suggests that there is a higher prevalence of pain conditions in individuals with MHD compared to those without MHD. After adjusting for demographic, socio-economic, and functional status, individuals with MHD were more likely to use opioids for chronic pain conditions, but they were not more likely to initiate opioids for acute or chronic pain conditions. Once opioids were initiated for chronic pain conditions, patients with MHD were more likely to transition to long-term opioid therapy. These findings suggest that the high prevalence of opioid use in MHD patients may reflect a higher rate of transition from short-term to long-term opioid use, rather than a higher likelihood of opioid initiation.

ORAL VERSUS INTRAVENOUS FLUOROQUINOLONES FOR THE INITIAL TREATMENT OF COMMUNITY ACQUIRED PNEUMONIA IN HOSPITALIZED PATIENTS Michael B. Rothberg³; Raquel K. Belfort¹; Tara Lagu²; Sarah Haessler⁴; Penelope S. Pekow¹; Aruna Priya²; Daniel Skies⁴; Thomas Higgins¹; Mihaela S. Stefan¹; Peter K. Lindenauer¹. ¹Baystate Medical Center, Springfield, MA; ²Baystate Medical Center, Florence, MA; ³Cleveland Clinic, Cleveland, OH; ⁴Baystate Medical Center, Springfield, MA. (Tracking ID #2198009)

BACKGROUND: Fluoroquinolones are widely used in the treatment of community-acquired pneumonia (CAP) and they have equivalent oral (PO) and intravenous (IV) bioavailability, but patients hospitalized with CAP are generally treated intravenously. We compared the outcomes of hospitalized patients with CAP initially receiving intravenous vs. oral respiratory fluoroquinolones.

METHODS: We conducted a retrospective cohort study of adult patients hospitalized for CAP at 340 hospitals between 2007 and 2010. We included patients who could tolerate PO medication, who were not in a critical care setting, and who received IV or PO levofloxacin or moxifloxacin during the hospitalization. The primary outcome was in-hospital mortality; secondary outcomes included treatment failure (defined as adding other broad spectrum antibiotics on hospital day 2 or later), admission to intensive care (ICU), invasive mechanical ventilation (IMV), and use of vasopressors initiated on or after the second hospital day (defined as “late ICU” or “late IMV”), hospital length of stay (LOS), and hospitalization cost. Including only hospitals where at least one person was treated with a PO quinolone ($n=178$), we developed a propensity model for PO treatment that included patient demographics, co-morbidities and other initial treatments (c-statistic=0.82). We then applied the propensity model to the entire cohort and created Stabilized Inverse Probability of Treatment Weighting (SIPTW) models for each of the outcomes. Multivariable hierarchical generalized linear models were developed to assess the independent association between initial treatment with a PO quinolone and each outcome adjusted for patient characteristics, other early treatments, propensity for PO treatment, predicted mortality, and hospital characteristics. SAS software procedure GLIMMIX was used to account for the hierarchical nature of the data (patients clustered within hospital and with hospital as a random effect).

RESULTS: Of the 36,405 patients who met inclusion criteria, 34,200 (94 %) were initially treated with an IV respiratory quinolone and 2205 (6 %) received PO treatment. Rates of initial PO use across hospitals varied from 0 to 90 % (median 4.4 %, interquartile

range 1.7 to 7.9 %). Patients who received initial oral quinolones were younger (67 vs. 71 years), more likely to be black (13.5 vs. 11.0 %) or obese (11.3 vs. 9.9 %), and to have a diagnosis of chronic obstructive lung disease (46.7 vs. 44.1 %); they were less likely to have a principle diagnosis of sepsis (6.5 vs. 9.4 %) and to have sputum cultures (8.6 vs. 13.9 %), blood cultures (74.2 vs. 88.3 %), or blood lactate levels (4.2 vs. 7.6 %) drawn ($p<0.001$ for all comparisons). Of patients initially receiving PO treatment, 54 % completed treatment PO and 34 % were switched to an IV quinolone. Of those beginning with IV quinolones, 55 % completed their course IV and 31 % were switched to a PO quinolone prior to discharge. Compared with those who received IV quinolone, those who received PO quinolones had lower unadjusted mortality (2.5 vs. 1.4 %, $p=0.001$), less treatment failure (16.9 vs. 19.3 %, $p=0.007$), shorter mean hospital length of stay (5.3 ± 4.8 vs. 5.0 ± 4.1 , $p<0.001$) and lower median hospital cost (\$5585 vs. \$5456, $p=0.07$). There were no significant differences in late ICU (4.2 vs. 3.9 %, $p=0.53$), late IMV (3.0 vs. 3.1 %, $p=0.76$), or late vasopressors use (2.7 vs. 2.6 %, $p=0.78$). In multivariable models, PO treated patients had lower rates of treatment failure (OR 0.84; 95 % CI 0.74–0.96), but no statistically significant differences in hospital mortality (OR 0.82; 95 % CI 0.58–1.15), hospital length of stay (RR 1.01; 95 % CI 0.98–1.03), hospital costs (RR 1.00; 95 % CI 0.98–1.02), late ICU admission (OR 1.04; 95 % CI 0.80–1.36), late use of IMV (OR 1.17; 95 % CI 0.87–1.56), or late use of vasopressors (OR 0.94; 95 % CI 0.68–1.30) between the 2 groups.

CONCLUSIONS: Among patients hospitalized for CAP who tolerate oral medications, respiratory quinolones administered orally on admission are associated with similar outcomes when compared to intravenous administration.

ORGANIZATIONAL APPROACHES EFFECT SAFETY-NET HOSPITALS' CANCER CARE QUALITY Nina A. Bickell²; Allie Moss³; Maria Castaldi⁴; Ajay Shah⁵; Alan Sickles⁶; Peter Pappas⁷; Theophilus Lewis⁸; Margaret Kemeny⁹; Shalini Arora¹⁰; Lori Schleicher¹¹; Anitha Srinivasan¹²; Leslie L. Montgomery¹³; Kezhen Fei¹; Bonnie Bellacera²; Rebeca Franco²; Ann S. McAlearney³. ¹Mount Sinai School of Medical, New York, NY; ²Mount Sinai School of Medicine, New York, NY; ³The Ohio State University, Columbus, OH; ⁴Jacobi Hospital Center, Bronx, NY; ⁵Bronx-Lebanon Hospital Center, Bronx, NY; ⁶Lutheran Medical Center, Brooklyn, NY; ⁷Brooklyn Hospital Center, Brooklyn, NY; ⁸Kings County Hospital Center, Brooklyn, NY; ⁹Queens Hospital Center, Jamaica, NY; ¹⁰Elmhurst Hospital Center, Elmhurst, NY; ¹¹Newark Beth Israel Medical Center, Newark, NJ; ¹²Metropolitan Hospital Center, New York, NY; ¹³Montefiore Medical Center, Bronx, NY. (Tracking ID #2195955)

BACKGROUND: Safety-net hospitals, historically at higher risk for delivering poor-quality care, provide a disproportionate amount of care to vulnerable populations. Some safety-net institutions deliver excellent quality cancer care. We undertook this study to determine the impact of organizational factors on breast cancer care quality.

METHODS: We abstracted charts of 389 breast cancer patients treated in 2009–12 at 9 inner-city safety-net hospitals with high proportions of minority breast cancer patients to measure underuse of needed adjuvant treatment. We interviewed 90 key informants ($n=59$ clinical; $n=16$ administrative; $n=12$ clerical; $n=3$ other) about how care is coordinated and delivered. Using Qualitative Comparative Analysis, we defined “conditions” —handoffs, no-shows, organizational culture—that particularly impact care coordination, categorized hospitals into low (<10 %), intermediate (10–20 %) and high (>20 %) underuse of needed adjuvant therapies, and calibrated each of the “conditions.” Hierarchical models assess impact of organizational and patient factors on underuse.

RESULTS: Underuse ranged from 8 to 29 %. Higher quality sites designated individuals to track & follow-up no-shows; shared clinical information during handoffs; had fully integrated EHRs enabling providers and clerks to transfer responsibility across specialties; had strong system support; paid close organizational attention to clinic patients; and allocated adequate resources for the cancer clinics. Organizations with a patient-centered culture focused on making processes easier for patients. Poor quality sites lacked these organizational characteristics. Multivariate modeling found that beyond patient older age (RR=1.89; 1.14–3.15), hospitals with strong approaches to follow-up affect underuse rates (RR=0.24; 0.08–0.738).

CONCLUSIONS: At safety-net hospitals, underuse of needed cancer therapies is affected by patient older age and organizational approaches to track and follow-up treatment. These findings offer strategies to safety-net hospitals to improve cancer care quality.

OUTPATIENT PROGRESS NOTE QUALITY USING MEDICAL SCRIBES VS. USUAL CARE Anita D. Misra-Hebert¹; Linda Amah¹; Bo Hu¹; Andrew J. Rabovsky²; Michael B. Rothberg¹. ¹Cleveland Clinic, Cleveland, OH; ²Cleveland Clinic and Case Western Reserve University School of Medicine, Beachwood, OH. (Tracking ID #2198563)

BACKGROUND: As primary care delivery is redesigned to meet the complex needs of our patient populations, many team-based models of care are using medical scribes to

improve the efficiency of the patient encounter, often to counter the time intensity required for electronic documentation. It is unknown how the use of scribes in the outpatient setting may impact the quality of the visit progress notes. A new team-based model of care delivery being implemented in our health system's primary care clinics involves medical assistants scribing notes during the outpatient primary care encounter. We hypothesized that the quality of the outpatient physician notes written by medical assistant scribes would be similar to the quality of notes written by the same physicians without a scribe.

METHODS: The Physician Documentation Quality Instrument 9 (PDQI-9) is a validated instrument designed to assess physician note quality. The PDQI-9 consists of 9 individual items rated subjectively on a 5-point Likert scale, including assessment of whether notes are Up to Date, Accurate, Thorough, Useful, Organized, Comprehensible, Succinct, Synthesized, and Internally Consistent, as well as a total score. The PDQI-9 has been previously used in the inpatient and outpatient settings to assess note quality. At the time of this study, nineteen primary physicians had transitioned to the new team-based model with medical assistants acting as scribes. We conducted a retrospective chart review of ambulatory progress notes from all of these physicians. All physician notes either with a visit diagnosis of diabetes or a visit slot designated as "same day" for all providers practicing in our new team-based model using scribes were requested for the following time frames: 3 months preceding the use of scribes (Time Period 1), and 3 to 6 months after starting the new model (Time Period 2). The principal investigator and one medicine resident independently coded 10 randomly selected progress notes using the PDQI-9 tool, as well as a 5-point redundancy scale, and discussed the results. The process was repeated for a total of 20 notes, after which consensus was reached with >70 % agreement on each attribute of the PDQI-9. The resident then evaluated a random sample of notes written by each physician including notes from same-day appointments and notes from a diabetes encounter in Time Periods 1 and 2. The paired t-test was used to compare the non-scribed and scribed note quality scores.

RESULTS: We reviewed 89 notes from Time Period 1 and 63 notes from Time Period 2, which were written by 19 physicians and 33 scribes. Compared to notes written by the physician alone, scribed notes did not differ in overall quality (mean total PDQI-9 score 29 for non-scribed notes vs. 30 for scribed notes, $p=0.28$). Scribed notes were rated as more Up to Date (mean item score 3.6 vs. 3.3, $p=0.03$), Thorough (mean 3.8 vs. 3.4, $p=0.03$), and Useful (mean 3.8 vs. 3.4, $p=0.008$), but also more redundant (Table). For diabetes encounters, scribed notes did not differ in overall PDQI-9 score, but were rated as more Useful (mean 3.8 vs. 3.4, $p=0.02$) and Comprehensible (mean 3.4 vs. 3.0, $p=0.02$) but also more redundant (mean item score 3.6 vs. 3.2, $p=0.04$) while for same day appointments notes did not differ for scribed and non-scribed notes. Scribed progress notes were longer (mean word count (SD) 608(267) for scribed notes vs. 516(267) for non-scribed notes, $p=0.04$).

CONCLUSIONS: The overall quality of ambulatory notes scribed by medical assistants is similar to that of physicians writing alone. Scribed notes may be more thorough, up to date, comprehensible, and useful, but also more redundant. The quality of notes written by professional scribes or in other settings remains unknown.

The relationship between Scribed and Non-Scribed notes and PDQI-9 scores

	Time Period 1 (Non- scribed Notes)	Time Period 2 (Scribed Notes)					
	N	Mean	SD	N	Mean	SD	p value
1. Up to Date	89	3.3	0.77	63	3.6	0.81	0.03
2. Accurate	89	3.1	0.35	63	3.0	0.33	0.88
3. Thorough	89	3.4	1.12	63	3.8	0.97	0.03
4. Useful	89	3.4	0.78	63	3.8	0.75	0.01
5. Organized	89	3.2	0.64	63	3.2	0.85	0.54
6.	89	3.1	0.67	63	3.3	0.83	0.04
Comprehensible							
7. Succinct	89	3.1	0.78	63	2.8	1.12	0.06
8. Synthesized	89	3.5	1.00	63	3.6	1.10	0.54
9. Internally Consistent	89	3.0	0.45	63	2.9	0.81	0.36
Total	89	29	4.65	63	30	5.06	0.28
PDQI-9 Score							
Level of Redundancy	89	3.1	0.49	63	3.3	0.84	0.04

N=Number of Notes

SD=Standard Deviation

OUTPATIENT VISIT FREQUENCY AND CHRONIC DISEASE CONTROL AMONG MEDICAID-INSURED VERSUS UNINSURED INDIVIDUALS: A NATIONAL PERSPECTIVE. Andrea S. Christopher¹, ¹Danny McCormick²; Steffie Woolhandler³; David Himmelstein³; David Bor⁴; Andrew P. Wilpers. ¹Cambridge Health Alliance, Boston, MA; ²Harvard Medical School / Cambridge Health Alliance, Cambridge, MA; ³City University of New York School of Public Health, New York, NY; ⁴Cambridge Health Alliance, Cambridge, MA; ⁵University of Washington School of Medicine, Boise, ID; ⁶Harvard Medical School, Boston, MA. (Tracking ID #2198585)

BACKGROUND: Medicaid's ability to improve health outcomes remains controversial. The Oregon Health Insurance Experiment found modest increases in outpatient visits, but did not find significant changes in selected measures of physical health for those newly covered by Medicaid. However, that study was conducted in a single metropolitan area with a strong medical safety-net, and may not be nationally representative. We sought to determine the impact of Medicaid coverage on the frequency of outpatient visits and on awareness and control of chronic medical conditions among low-income adults nationally.

METHODS: We analyzed data from the 1999–2012 National Health and Nutritional Examination Surveys, which annually collected interview, laboratory and physical examination data on a nationally representative sample of the United States population. We identified adults aged 18 to 64 with incomes below the federal poverty level who were either uninsured ($n=2975$) or had Medicaid ($n=1485$). We used logistic regression to estimate the association between having Medicaid (versus being uninsured) and the frequency of outpatient visits, controlling for demographic and clinical characteristics. We also estimated the effect of having Medicaid on the likelihood that persons with chronic diseases (diabetes, hypertension, hyperlipidemia and overweight/obesity) knew of their condition, and whether their condition was controlled. Diagnosis and control for each condition was based on patient report, prescription drug usage, laboratory and physical exam findings, and established clinical guidelines (diabetes: HgA1C>6.5 % or fasting glucose>125 mg/dL, hypertension: SBP>140 mmHg or DBP>90 mmHg, hyperlipidemia: total cholesterol>240 mg/dL, overweight/obesity: body mass index>25).

RESULTS: Individuals with Medicaid coverage were more likely than the uninsured to have at least two outpatient physician visits annually (versus zero or one visit), even after controlling for patient characteristics (OR 3.54, 95 % CI, 2.91 to 4.32). Results were unchanged in sensitivity analyses using alternative cut-points of visit frequency. Among persons with objective evidence of hypertension, those with Medicaid were more likely to be aware of their condition (OR 1.83; 95 % CI, 1.26, 2.66) and to have their blood pressure controlled (OR 1.69; 95 % CI, 1.32, 2.27). Medicaid enrollees were also more likely to be aware of being overweight/obese (OR 1.30; 95 % CI, 1.02, 1.67). Medicaid coverage was not associated with awareness or control of diabetes or hyperlipidemia.

CONCLUSIONS: Among poor adults nationally, Medicaid coverage is associated with a substantial increase in outpatient visit frequency, awareness of hypertension and overweight/obesity, and hypertension control. Our study suggests that among low-income adults in the United States, Medicaid offers protection against some common chronic conditions.

OVERDOSE EDUCATION AND NALOXONE PRESCRIBING FOR PATIENTS ON CHRONIC OPIOIDS: A QUALITATIVE STUDY OF PATIENTS PRESCRIBED OPIOID MEDICATIONS Ingrid A. Binswanger^{1, 2}; Steve Koester^{2, 2}; Shane Mueller^{1, 2}; Edward M. Gardner³; Kristin Goddard¹; Jason M. Glanz^{1, 4}. ¹Kaiser Permanente Colorado, Denver, CO; ²University of Colorado Denver, Denver, CO; ³Denver Health and Hospital Authority, Denver, CO; ⁴Colorado School of Public Health, Aurora, CO. (Tracking ID #2198188)

BACKGROUND: Substantial increases in fatalities from opioid overdose have been observed across the United States in the last decade. Naloxone is an effective opioid antidote which may be prescribed to individuals at risk for overdose for administration by a bystander in the event of respiratory depression. While patients on chronic pharmaceutical opioids for pain could benefit from naloxone prescription, our prior interviews with primary care providers suggest that providers are worried about how patients would respond to education about overdose and naloxone. Thus, this study was designed to elucidate the knowledge, attitudes and beliefs about overdose prevention and naloxone among patients prescribed chronic opioid medications.

METHODS: We conducted semi-structured qualitative interviews with patients in two large health systems in Colorado—a system of federally qualified health centers (Denver Health) and a large integrated managed care organization (Kaiser Permanente Colorado). An interview guide was developed using domains from the Theory of Planned Behavior and the Health Belief Model. Interviews were audio recorded, transcribed, then and coded using ATLAS.ti® qualitative software. Our overall qualitative analysis approach included both inductive and deductive coding and theme development.

RESULTS: We enrolled 13 English speaking patients ages 21–65 who received three or more high dose (≥ 100 MME daily dose) DEA Schedule II controlled opioid prescriptions, such as oxycodone, hydromorphone, or fentanyl, in the last 6 months. We excluded patients who had a Do Not Resuscitate status or with a cancer diagnosis in the last 12 months. Nine (82 %) patients were enrolled from Denver Health and 4 (18 %) were enrolled from Kaiser. Seven (54 %) patients were female, mean age was 52 years (range 33–63 years), 10 were white, 2 were Hispanic or Latino, and 1 was African American. Participants had been prescribed opioid medications for a median of 5 years (range 2–40 years). The following themes emerged (see table for illustrative quotes): Patients identified several behaviors that they believed decrease the risk of pharmaceutical opioid overdose, including taking the medications at consistent times, not doubling up on medications, having been prescribed the medications for a long time, and only taking medications prescribed to them. They also revealed histories and risk behaviors, such as alcohol use, that they were reluctant to share with their provider for fear of having their opioid medications discontinued. While prior experience and knowledge of overdose and naloxone was limited, being prescribed naloxone was highly acceptable. Patients with long term trusting relationships with primary care providers expressed openness to discussions about overdose and naloxone. Patients in our study easily identified existing family and caregiver supports who could administer naloxone, if trained. Some patients feared that their provider would wean them from opioids if they identified them at risk for overdose.

CONCLUSIONS: Our qualitative interviews with patients on high-dose chronic opioids for pain suggest that naloxone prescription is acceptable to patients, particularly when they have established long-term relationships with their providers. However, patients lacked some knowledge about overdose and had not discussed key risk behaviors with their providers. Based on our findings, providers may wish to avoid coupling discussions about overdose and naloxone with discussions about weaning opioids. Further research is needed to see if our qualitative findings represent the broader population of patients on chronic opioids.

Table: Emerging Themes and Illustrative Quotations

Emerging Theme	Illustrative Quotation
Patients identified behaviors which they believed decrease the risk of pharmaceutical opioid overdose, including taking the medications at consistent times, not doubling up on medications, having been prescribed the medications for a long period of time, and only taking medications prescribed to them.	Quote 1: "They're severely at risk because if the...like the two they just prescribe for me, I take two, whereas they may take two and not feel nothing so they take two more or two more. Before you know it, they take six or eight and then there's a lot bigger chance for them to overdose." Quote 2: "Somebody who is just now starting out on them because like I say, they'll take two that's supposed to help them but the pain is so great that it doesn't help so then they'll take two more but me I know...I know what the...how the pain is going to affect me and how the medicine affects me so I know basically the do's and don'ts to keep my pain at a tolerable level." "You know, it's like I don't drink. And I know you're not supposed to drink on them, but every now and then I figure why not (laughing). I don't know if that's wrong or that's right..."
Patients also revealed histories and risk behaviors that they were reluctant to share with their provider for fear of having their opioid medications discontinued. While prior experience and knowledge of overdose and naloxone was limited, being prescribed naloxone was highly acceptable.	Quote 1: "I don't know much about overdose. I don't have any personal experience with it. I don't know anybody who has overdosed except what I've read in the newspapers." Quote 2: "Well, I believe that every person that is prescribed an opiate should be let known about this new drug [naloxone] and in case the overdose does happen, there's something available to counter act that and I don't know if it would be in the insurance policy or every person that gets the prescription will be able to get that. What I believe it'll be important, it'll probably save a lot of lives."

(continued)

Long term trusting relationships with primary care providers enhanced openness to discussions about overdose and naloxone.

Quote 1:

"Oh, Dr. Lxxx is like I say she's great... she communicates well. We just click together. I mean, you know? She...you know, and at first, I mean it took a couple years to build that trust up, you know, that I'm not a drug seeker and, you know, and once we've gotten that trust not only her with me, but me with her, it makes things a lot easier, you know? And, I can talk, you know, and I'm not scared to ask questions."

Quote 2:

"Well, I've known my doctor for a while now so me and her are best buds (laughing) so it took a while to get to that point though, but she knows me. She knows like if my attitude has changed, she'll go I want a UA (laughing)."

Quote 1:

"Yeah. And I know she [my wife] can do the shots cause I am hypoglycemic and stuff and they give me a shot...a thing to carry, you know, some powdered stuff and you've got to put the medicine...the liquid inside the powder, shake it up and then redraw it and then..."

Quote 2:

I: "So has she had to give you a shot before then?"

R: "Yeah, so I know she can."

Patients had existing family and caregiver supports who could be trusted to administer naloxone, if trained

PALLIATIVE CARE QUALITY INDICATORS FOR PATIENTS WITH END STAGE LIVER DISEASE Anne Walling⁴; Sangeeta Ahluwalia²; Neil Wenger³; Patty Smith²; Marika Booth²; Carol Roth²; Karl Lorenz⁶; Fasiha Kanwal⁷; Sydney M. Dy¹; Steven Asch⁵. ¹Johns Hopkins, Baltimore, MD; ²RAND Corporation, Encino, CA; ³UCLA, Los Angeles, CA; ⁴UCLA, Studio City, CA; ⁵VA, Menlo Park, CA; ⁶VA Greater Los Angeles Healthcare System, Los Angeles, CA; ⁷Houston VA, Houston, TX. (*Tracking ID #2196734*)

BACKGROUND: End stage liver disease is a common condition and cause of death. While there are guidelines and quality indicators for the medical management of cirrhosis, quality indicators focusing on standards for palliative aspects of end stage liver disease care are needed because measurement can lead to improvement in care.

METHODS: We convened a 9-member, multidisciplinary expert panel and used RAND/UCLA modified Delphi methods to develop palliative care quality indicators for patients with cirrhosis. Experts were provided with a report based on a systematic review of the literature that contained the evidence supporting the proposed candidate quality indicators. Panelists rated each quality indicator prior to a planned meeting using a standard 9-point RAND appropriateness scale. These ratings guided discussion during a day-long telephone conference meeting, and final ratings were then provided by panel members. Final indicator scores were computed and quality indicators with a final median score of greater than or equal to 7 and no disagreement were included in the final set.

RESULTS: Among 28 candidate quality indicators, the panel rated 19 as valid measures of quality care. These 19 quality indicators cover care related to information and care planning (13) and supportive care (6). An example of a quality indicator in the information and care-planning domain is: IF a patient with advanced end stage liver disease is newly diagnosed with hepatic encephalopathy and does not have advance care planning previously documented, THEN the medical record should document advance care planning or lack of ability to do so within one month, BECAUSE patients with a history of hepatic encephalopathy are at a higher risk of lacking capacity to make decisions for themselves and care should be guided by their goals and preferences. An example of a quality indicator in the supportive care domain is: IF a patient has advanced end stage liver disease, THEN the patient should not be prescribed NSAIDs, BECAUSE of the increased risk of renal toxicity and bleeding.

CONCLUSIONS: These quality indicators are evidence-based process measures of care that can be used to ensure that patients with cirrhosis receive high quality palliative care. Research is needed to better understand the quality of palliative care provided to patients with cirrhosis.

PARTNERING WITH PATIENTS FOR SAFETY: THE OPENNOTES PATIENT REPORTING TOOL Sigall K. Bell¹; Roanne Mejilla¹; Mary Barry³; Tom Delbanco³; Beth French³; Macda Gerard³; Amy B. Goldman³; Heidi S. Jay³; Susan E. Johnson³; Gila Kriegel³; Julia Lindenberg³; Lawrence J. Markson³; Elana Premack-Sandler⁵; Kenneth Sands²; Jan Walker¹; Gail Wood³; Patricia H. Folcarelli³. ¹BIDMC, Brookline, MA; ²Beth Israel Deaconess, Boston, MA; ³Beth Israel Deaconess Medical Center, Boston, MA; ⁴Beth Israel Deaconess Medical Center, Brookline, MA; ⁵Jewish Social Service Agency, Washington, DC. (Tracking ID #2201030)

BACKGROUND: Safety experts struggle to improve patient engagement and reduce error in ambulatory care. OpenNotes, a national movement to invite patients to review their clinicians' visit notes online, can offer opportunities for patients to report possible errors in their notes, yielding potential safety benefits.

METHODS: In collaboration with Health Care Quality, Information Systems, Patient Relations, Health Information Management, Social Work, the Patient and Family Advisory Council, and clinicians in our hospital-based primary care practice which offers patients access to signed notes, we developed and implemented an online patient reporting tool linked to OpenNotes. Through email notification on the patient portal, we invited patients in 2 of 10 practice teams to participate. A link at the end of the open note led to a 10-question survey with quantitative and qualitative questions. "Potential safety concerns" were defined as not understanding the plan of care or reporting a possible inaccuracy in a note, and patient relations personnel shared safety concerns with providers and documented whether changes were made to the record or practice.

RESULTS: We analyzed the first 105 reports submitted between Aug-Dec 2014. Patients comprised 95 % of respondents; informal caregivers with proxy access to the patient portal also used the tool (5 %). Nearly all participants reported understanding the note (98 %); of those, 90 % thought it accurately described the visit. The vast majority (95 %) of respondents reported understanding the plan of care. Patients and caregivers documented "potential safety concerns" in 22 % of reports. Concerns included possible inaccuracies in medications (30 %); something important missing from the note (22 %); inaccurate report of symptoms (17 %), past medical history (13 %), family history (10 %); or "other" (35 %) (for example, documenting that a patient declined a PSA exam, when he was interested in having one). Nine percent of patients reported physical exam inaccuracies, including parts of the physical exam documented but not done. The majority of safety concerns resulted in a change to the record or care. In response to an optional open-ended query, 71 % of respondents provided positive feedback about providers and/or open notes. Asked what they liked about or learned from their notes, patients and caregivers commented on the ability to catch mistakes. They reported that reading notes helps "double check I didn't miss anything if I was not feeling well or was too overwhelmed," and "Reading the note takes the burden off of me to remember the details of what we discussed." Others reported that open notes helped clear up misunderstandings from the visit, remember next steps, access test results faster, and contextualize results: "I like knowing what the results of my tests mean. The records shows the numbers, but the notes provides the interpretation in regards to my personal health status." Some found it "helpful for my style of learning to see it in writing, in addition to hearing the information." A caregiver noted, "We are grateful to receive notes to be able to review the visit and procedures (if any) performed. [Open notes are] especially helpful for older patients who may have hearing and/or some cognitive/memory loss." Some patients used notes to check how well they were communicating, and whether they were heard and understood by their providers. Finally, patients noted that the reporting tool "gives me an opportunity to play an active role in my health care," and that it "supports my strong belief that this is a partnership between me and my medical providers." Another added, "Health care should be a two-way conversation; this forum provides another opportunity for that." The majority of reporting tool users found it "very valuable" and would use it again (87 %); an additional 13 % found it "somewhat valuable." Assuming similar activity and extrapolating to the 10 teams in our ambulatory practice, these data predict over 1200 reports and almost 300 otherwise unidentified risks annually, reflecting a nearly 50 % increase in ambulatory reporting through our hospital's online event report system.

CONCLUSIONS: Although skeptics wonder whether patients can really understand notes, the overwhelming majority of participants reported they did. Patients and informal caregivers can find inaccuracies and reported them in about one-quarter of reports, resulting in a change in the record or care in the majority of cases. An online patient reporting tool linked to open notes can help engage patients as safety partners, support providers with positive feedback, and inform organizations of opportunities to improve care.

PATIENT AND CARE TEAM FACTORS ASSOCIATED WITH OPTIMIZING CARE IN DIABETIC PATIENTS WITH POOR GLYCEMIC CONTROL You Wu¹; Hong Xiao²; Richard W. Grant². ¹Kaiser Permanente, Oakland, CA; ²Kaiser Permanente Northern California, Oakland, CA. (Tracking ID #2199766)

BACKGROUND: Prolonged hyperglycemia can lead to diabetic complications and increased health care costs. In the optimal case, prompt management changes would be

made to regain glycemic control when a previously well-controlled patient has an elevated hemoglobin A1c (HbA1c). As health care shifts towards accountable care organizations and integrated delivery systems, many health care institutions have adopted team-based strategies to optimize diabetes care, including population management by nurses, proactive outreach, and pre-approved treatment algorithms implemented by pharmacists. While studies have validated the use of nursing case management and pharmacist-based protocols, few studies have examined the contribution of patient factors, different components of the care team, and types of care team interventions in returning poorly controlled patients to more effective glycemic control.

METHODS: We conducted a case control study to examine patient- and team-level factors associated with persistence vs. resolution of elevated HbA1c levels within a 3-month period. Among patients with type 2 diabetes receiving care in Kaiser Permanente Northern California from 2011 to 2014, we identified a cohort with newly elevated HbA1c (i.e. 2 A1c levels of $\leq 8\%$ followed by an "index" elevated HbA1c $\geq 10\%$). From this cohort, we selected cases with persistent HbA1c elevation (subsequent two HbA1c values after the index HbA1c remained $\geq 10\%$, $n=100$) and controls who regained glycemic control (subsequent two HbA1c's after index HbA1c both $\leq 8\%$, $n=100$).

RESULTS: We found several significant differences between cases and controls in patient-level factors. Cases (persistent poor control) were more likely to be female (OR=2.03, 95 % CI [1.15, 3.60], $p=0.01$), to be on insulin prior to index HbA1c (4.5, [2.0, 10.2], $p<0.001$), and to have longer DM duration (OR >10 years duration=2.71, [1.38, 5.33], $p=0.004$), but had similar prevalence of any psychiatric diagnosis (33 % vs 33 %, $p=0.52$) compared to controls who regained glycemic control. Initial team response to the index elevated HbA1c was similar between cases and controls. Both groups were contacted within 3–5 days ($p=0.125$), initial encounter types (e.g. by phone, mail, secure message or in-person) were similar ($p=0.41$), and success rates in reaching patients were similar (52–59 %, $p=0.10$). However, cases required more outreach attempts (1.35 attempts vs 0.65 attempts, $p=0.005$) and more phone calls (1.34 calls vs 0.61 calls, $p=0.01$). Cases took longer to establish contact with their PCP (61 days vs 22 days, $p<0.001$), had fewer visits with their PCP (2.6 vs 4.2, $p=0.004$), were less likely to have their regimen intensified (0.26 [0.11, 0.64], $p=0.004$), and had a lower proportion of follow-up visits within 3 months that were DM-specific (58 % vs 68 %, $p=0.02$). They also took longer to obtain their follow up HbA1c serum blood test (146 days vs 103 days; $p<0.001$). Both groups had similar no show rates ($p=0.7$). Cases also had greater odds of self-monitoring blood glucose (7.05, [3.39, 14.67] $p<0.001$) and having noted stressors (e.g. family death, caregiving, financial issues) compared to the control group (2.5, [1.3, 4.7], $p<0.01$).

CONCLUSIONS: We sought to understand how healthcare delivery is different between patients who rapidly regained diabetic control and patients who remained out of control. We found that patients who took longer to regain control had both disease-related factors (longer diabetes duration, more insulin use) and patient-related barriers (more life stressors, less self-monitoring). Earlier PCP involvement in patient's diabetes care and more visits with PCP were both associated with earlier return to diabetic control. Both case and controls received similar initial team responses to the index elevated HbA1c, but cases required more frequent subsequent outreach, were less likely to have regimen intensification, and had fewer diabetes-specific in-person PCP visits. Our findings suggest that within a team-based care model, earlier PCP involvement with visits focused specifically on diabetes management may enable more rapid return to glycemic control. As diabetes care increasingly shifts to multidisciplinary care teams, the PCP retains a pivotal role for more challenging patients with poor glycemic control.

PATIENT BELIEFS ABOUT THE BENEFITS OF HYPERTENSION AND DIABETES MEDICATIONS: THE ON-TIME STUDY Demetra Gibson¹; Paige Fairchild²; Neda Laiteerapong². ¹University of Chicago Medical Center, Chicago, IL; ²University of Chicago, Chicago, IL. (Tracking ID #2193456)

BACKGROUND: Treatment for hypertension (HTN) and type 2 diabetes (DM2) is focused on controlling blood pressure (BP) and sugar levels in order to prevent future complications; however, adherence to chronic disease medications is as low as 40 %. Because hypertension and diabetes are largely asymptomatic diseases, patients may feel few benefits from taking medications, and so, patient beliefs about their medications' long-term benefits may greatly influence their adherence. We sought to understand what benefits patients ascribe to their hypertension and diabetes medications, and to determine if associations existed between their beliefs and their characteristics, adherence and disease control.

METHODS: In this mixed methods study, we included 60 patients with both HTN and DM2 treated with oral medications, randomly selected from an academic primary care clinic. Semi-structured interviews were conducted, audiotaped and transcribed. All patients were asked open-ended questions about the benefits they expected from their HTN and DM2 medications and their medication adherence. Data analysis used a modified template approach to text analysis. Five trained reviewers independently analyzed

transcripts. Each transcript was reviewed by at least two reviewers and coded by consensus. Baseline demographic and clinical data were collected from the medical record. Chi-square tests were performed to look for associations between beliefs and patient characteristics, medication adherence and disease control. Benefits were categorized as short-term benefits (BP/sugar or symptom control) or long-term benefits (e.g., decreased risk of complications).

RESULTS: All 60 participants identified at least one benefit they expected from HTN medicine, and 59/60 identified at least one benefit from DM2 medicine. For both HTN and DM2, more participants named short-term than long-term benefits (HTN: 78 % vs. 53 %, $p=0.004$; DM2: 77 % vs. 37 %, $p<.001$). The most frequent short-term benefit identified was to control BP (68 %) and sugars (70 %). Other short-term benefits included decreased headache, dizziness and swelling for HTN medicines, and avoiding insulin and decreased thirst and blurry vision for DM2 medicines. More participants identified long-term benefits from HTN than DM2 medications, although the difference was not significant (53 % vs. 37 %, $p=0.07$). The most prevalent long-term benefits were decreased stroke (28 %) and heart disease (23 %) for HTN and decreasing complications in general (15 %) for DM2. Other less frequently mentioned long-term benefits of DM2 medications included decreasing amputation, eye disease and kidney disease. In bivariate analysis, younger age (<60 vs. ≥ 60 years) was associated with identifying a short-term benefit of HTN medications (92 % vs. 67 %, $p=0.03$). Females named long-term benefits of HTN medications and identified both short and long term benefits more frequently than males (67 % vs. 29 %, $p<0.01$; 41 % vs. 14 %, $p=0.04$, respectively). Participants who reported never missing any HTN medications in the last 7 days were able to name a short-term benefit of HTN medications more often than those who missed at least 1 day (100 % vs. 71 %, $p=0.03$). There were no significant associations between identifying short- or long-term benefits and race, marital status, education, income, HTN duration, or BP control. For DM2, education level and income were associated with identifying both short- and long-term benefits of medications. Among individuals with annual income $\geq \$35,000$, 37 % named both a short- and long-term benefit, compared to only 10 % of participants with income $< \$35,000$ ($p=0.047$). Among those individuals with HS education or less, no one (0 %) named both a short and long-term benefit, compared to 34 % of those with at least some college education ($p=0.049$). There were no significant associations between identifying short- or long-term benefits and age, gender, race, marital status, DM duration, A1c control, or adherence.

CONCLUSIONS: Our findings indicate that patients attribute multiple benefits to their chronic disease medications. In general, they identify more short-term than long-term benefits, and those patients who identified short-term benefits were more adherent with their HTN medications. A minority of patients were able to identify long-term benefits for their diabetes medications. Increased education on the long-term benefits of HTN and DM2 medications is necessary and may improve medication adherence.

PATIENT CHARACTERISTICS AND OUTCOMES OF OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY (OPAT): A RETROSPECTIVE STUDY.

Marie Yan¹; Marion Elligsen²; Nick Daneman². ¹University of Toronto, Toronto, ON, Canada; ²Sunnybrook Health Sciences Centre, Toronto, ON, Canada. (Tracking ID #2198985)

BACKGROUND: Outpatient parenteral antimicrobial therapy (OPAT) is a safe and effective alternative to hospitalization for many patients with infectious diseases. Although some institutions have established specialized clinics to provide OPAT services, this practice is not yet widespread. The objective of this study was to describe the OPAT experience at a Canadian tertiary academic centre in the absence of a formal OPAT program.

METHODS: A retrospective chart review was conducted for patients who were discharged home with parenteral antimicrobials from Sunnybrook Health Sciences Centre (SHSC) within a 1-year period. Descriptive statistics were performed.

RESULTS: Between June 1, 2012 and May 31, 2013, 104 patients were discharged home with parenteral antimicrobials. The median age was 63 years (interquartile range: 43–74) and the median length of stay was 7 days (interquartile range: 6–10). The most commonly treated syndromes include surgical site infections (33 %), osteomyelitis (25 %), and bacteremia (17 %). The most frequently prescribed antimicrobials were ceftriaxone (21 %) followed by cefazolin (20 %) and cloxacillin (14 %). Only 58 % of the patients received follow-up care from an infectious diseases specialist. In terms of outcomes, 43 % of the patients returned to the emergency room and 26 % required readmission within 60 days of discharge. The most common reasons for return visits were infection relapse/treatment failure (48 %) and OPAT-related complications (24 %).

CONCLUSIONS: A significant number of patients receive OPAT each year at SHSC and many have unplanned health care encounters because of issues related to their infection or

treatment. The creation of a formal OPAT clinic may streamline the care of these patients and reduce readmission and/or emergency room use. The results of this study have contributed to the funding and development of a 1-year pilot OPAT program at SHSC.

PATIENT NAVIGATION FOR COMPREHENSIVE CANCER SCREENING IN VULNERABLE PATIENTS USING A POPULATION-BASED HEALTH IT SYSTEM: RESULTS OF A RANDOMIZED CONTROL TRIAL

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BACKGROUND: Patient navigation (PN) can improve rates of cancer screening in vulnerable populations. Most cancer PN programs are located in community health centers and focus on a single cancer. However, many patients who could benefit from PN may receive care in settings where on-site PN is not practical or may be overdue for more than one cancer screening test. The objective of this study was to evaluate a PN program to help vulnerable patients obtain breast, cervical, and/or colorectal cancer screening within a large, diverse academic primary care network using a population-based information technology (IT) system.

METHODS: We implemented a visit-independent, population health management system to identify adult patients overdue for preventive cancer screening in an 18 practice primary care network with an integrated IT infrastructure. To identify overdue patients at increased risk for non-adherence with testing, we used an algorithm that included primary language spoken, number of overdue screening tests, and no-show visit history. We identified and randomized 1612 patients to intervention ($n=792$) or control ($n=820$) groups over an 8-month study period (April–December 2014). In the intervention arm, patient navigators used the IT system to track and navigate patients to obtain breast, cervical, and/or colorectal cancer screening. Control patients received usual care including automated mailed reminder letters in English or Spanish. The primary outcome was the average cancer screening test completion rate over 8-months of follow-up for each eligible patient, with all overdue cancers combined using unadjusted linear regression models. Additionally we also examined the percentage of time screening was up to date among each individual cancer overdue at baseline.

RESULTS: Among 1612 overdue patients, 46 % were overdue for 1 screening, 18 % were overdue for 2 screenings, and 36 % were overdue for 3 screenings at baseline with a similar distribution among intervention and control groups. There were no differences in age, gender, primary language, or insurance among intervention and control groups, while intervention group patients were slightly less likely to be white (62 % vs. 66 %, $p=0.02$). Among 792 intervention patients, 181 (23 %) could never be reached by telephone. Among the remaining 611 patients, 155 (25 %) were deferred for all overdue cancers (e.g. patient declined, competing comorbidity) and 202 (33 %) successfully completed an overdue cancer screening. The average proportion of time patients were up to date with screening over 8-months of follow-up among all eligible and overdue screening exams was higher in intervention patients for all cancers combined (10.2 vs. 6.8 %, $p<0.001$), and for breast (14.7 vs. 11.0 %, $p=0.05$), cervical (11.1 vs. 5.7 %, $p=0.002$), and colon (7.6 vs. 4.6 %, $p=0.005$) cancer screening compared to control patients.

CONCLUSIONS: Patient navigation using a visit-independent population management system significantly improved preventive cancer screening for breast, cervical and colorectal cancer for vulnerable patients at increased risk for non-adherence with testing in a large primary care practice network. Additional work is needed to increase the efficiency of patient navigators by designing a population management referral system and/or improving the algorithm to better identify high risk patients who could benefit from PN. Using patient navigators who are integrated into population health management activities for vulnerable patients within a practice network may help improve equity of care.

PATIENT OUT OF POCKET COSTS FOR HOSPITAL OBSERVATION SERVICES

Brian Doyle¹; Teryl K. Nuckols². ¹UCLA, Los Angeles, CA; ²Cedars Sinai Medical Center, Los Angeles, CA. (Tracking ID #2196720)

BACKGROUND: The use of hospital observation services has expanded dramatically in the last decade and should continue to increase with the Center for Medicare and Medicaid Services' implementation of the upcoming "two midnight rule." Because Medicare reimburses observation services through Medicare Part B rather than Part A, many authors have speculated that Part B's 20 % coinsurance rate may increase patient out of pocket costs. We sought to better characterize this phenomenon using both primary and secondary insurance payment information since 87 % of Medicare patients have a secondary insurer.

METHODS: We analyzed billing data from one year of observation encounters at UCLA Ronald Reagan and Santa Monica Medical Centers, categorizing each encounter's charges into clinical categories. We then calculated out of pocket costs (total charges minus all payments and adjustments) using data from both primary and secondary insurers.

RESULTS: Overall, median out of pocket costs were \$5.63 for all insured patients. By primary payer, median out-of-pocket costs were \$1.99 for Medicare, \$0.00 for private insurance, and \$100.98 for Medicaid. For encounters with Medicare as the primary insurer, 10.9 % had unpaid costs that exceeded the Part A inpatient deductible after all Medicare payments and adjustments. An average of 41 % of unpaid costs were covered by secondary insurers for patients with a secondary insurer. This phenomenon resulted in 4.9 % of Medicare patients with out of pocket costs greater than the Part A inpatient deductible after accounting for secondary insurer payments, and increasing overall secondary insurer payment by 3.4 %. Medicare observation encounters with hospital procedures or surgeries, administration of blood products, pharmacy costs over \$1000, or encounters lasting more than 48 h were significantly associated with potential unpaid costs greater than the Part A inpatient deductible.

CONCLUSIONS: While out of pocket costs for observation encounters are modest for most patients, a minority of Medicare encounters shift costs to the secondary insurer or patient, leaving patients without secondary insurance particularly vulnerable to increased costs and increasing overall secondary payer payment.

PATIENT PERCEPTION OF INTERPRETER QUALITY: A QUALITATIVE ANALYSIS OF PATIENT EXPERIENCES Alissa Detz¹; Gery Ryan³; Ron Hays^{1, 3}; Xavier Bermudez²; Leo Morales⁴; Gerardo Moreno². ¹University of California, Los Angeles, Los Angeles, CA; ²UCLA, Los Angeles, CA; ³RAND Corporation, Santa Monica, CA; ⁴University of Washington, Seattle, WA. (Tracking ID #2195965)

BACKGROUND: Approximately 9 % of individuals in the U.S. have limited English proficiency (LEP), defined as speaking English less than “very well.” Providing professional interpreters for LEP patients improves the patient experience and outcomes of care. Despite such benefits, access to interpreters is low across healthcare settings, and the quality of medical interpreters is not well studied. This study explores patient perceptions of a high quality medical interpreter.

METHODS: Spanish-speaking LEP adults 18 and older who used a medical interpreter for ambulatory care in the past year were recruited from 4 community sites in Los Angeles. We defined an interpreter as someone who helped communicate with an English-speaking doctor including in-person professional interpreters, telephone interpreters, video interpreters, bilingual medical staff, family, and friends. We conducted semi-structured interviews to explore patient experiences with language barriers and medical interpreters. Each participant described 3 encounters with a medical interpreter in the past 12 months: the most recent, the best and the worst experience. Participants were asked to reflect on the positive and negative aspects of the interpreter and interaction between the interpreter and physician. They were also asked about experiences with language barriers in the healthcare setting. Interviews were audio recorded and transcribed. All transcripts were reviewed, and themes were generated using a grounded approach. Qualitative analysis was conducted with Atlas.ti.

RESULTS: We interviewed 22 individuals (9 males and 13 females) with a mean age of 65. Individuals had lived in the U.S. for an average of 34 years, and most ($n=18$) had come to the U.S. from Mexico. Most individuals ($n=15$) had less than a high school education and all had annual incomes of $\leq \$30,000$. Respondents primarily discussed experiences with bilingual staff, family, or phone interpreters. Participants discussed challenges in seeking medical care including feeling ignored, uncertainty about interpreter access, and poor care when no interpreter was present. Three main factors valued in interpreters were 1) personal attributes, 2) communication and 3) extra-linguistic roles. Participants valued “displays of kindness” such as an interpreter smiling or greeting them. They described feeling uncomfortable when interpreters were antagonistic or frustrated. Participants placed importance on attentiveness, describing the benefits of an interpreter who was not rushed and who focused on interpreting for the duration of the encounter. Trust was also important in creating a positive experience, and interpreters were trusted if they treated people well, were helpful during a medical encounter and were easily understood. Participants recognized the role of the interpreter as facilitating communication with the physician. Although participants recognized their limited ability to judge interpreter linguistic proficiency, many emphasized the importance of an interpreter being fluent in English and Spanish and having knowledge of medical terminology. Individuals described selective communication, where interpreters filtered information between the patient and physician, or excluded the patient from the conversation. Participants also highlighted explanatory power, noting the advantage of an interpreter adequately communicating their concerns and ensuring they understood the physician’s assessment and instructions. In addition to assisting with communication, interpreters played several other vital roles, including providing health information beyond what was given by the physician, helping to navigate the healthcare system, offering psychological support during medical encounters, and serving as patient advocates.

CONCLUSIONS: Our respondents described multiple factors they valued in their medical interpreter beyond direct interpretation. Interpreter training programs should

consider teaching interpersonal skills and strategies to ensure communication with individuals of diverse socioeconomic and educational backgrounds in addition to focusing on linguistic ability. Improving care delivery for LEP patients requires adequate communication and support for patients as they navigate a complex healthcare system. Quality measures that incorporate the patient perception of interpreters may be important to evaluate medical interpreters and guide improvement efforts.

PATIENT RISK-STRATIFICATION AS A TOOL FOR ALLOCATING ADULT CARE COORDINATION SERVICES Tracy L. Johnson²; Michael J. Duffee²; Rachel Everhart²; Carlos Oronce²; Daniel Brewer²; Mary vander Heijde²; Deborah Rinehart²; Kathy Thompson³; Diana Botton¹; Jeremy Long²; Vishnu Kulasekaran²; Holly A. Batal². ¹DHMC, Denver, CO; ²Denver Health, Denver, CO; ³Denver Health and Hospital Authority, Denver, CO. (Tracking ID #2198696)

BACKGROUND: Multiple studies affirm that medical home-based transitions of care/care coordination services are associated with improved quality and patient satisfaction. However, evidence for net cost avoidance has been more mixed. We sought to implement a patient risk stratification methodology to identify patients in need of complex care coordination services and to evaluate the impact of this population health approach on overall health care costs as well as population-specific costs. Denver Health (DH) is an integrated safety net delivery system serving predominantly uninsured and publicly-insured patients. DH has explicitly defined an accountable population of 60,000 adult patients for which DH is—or should be—providing comprehensive, patient-centered, primary care-based services. Using a combination of clinical information, utilization history, and a predictive modeling tool, DH dynamically stratified this population and identified four broad categories (tiers) of care needs. A graduated set of enhanced clinical and HIT services are matched to each risk tier and allocated according to individual needs within tiers, with more and higher intensity services reserved for higher tier patients. The highest risk tier (Tier 4) patients were eligible for a variety of primary care-based interventions depending on additional individual-level factors. A transition of care (TOC) intervention was implemented for recently discharged patients to ensure prompt primary care follow-up and identification of any additional follow-up needs. TOC patients were referred, as needed, to on-going complex care coordination services as were other Tier 4 patients identified as high-risk by clinical teams. Individuals with repeat readmissions (“super-utilizers”) were screened for eligibility for separate primary care clinic for exclusively high-risk patients, organized according to ambulatory-ICU model.

METHODS: We analyzed Medicaid managed care data to validate the financial stratification. We quantified overall health care costs via an independent actuarial analysis of the entire patient population inclusive of high- and low-risk adults. Hypothesizing that Tier 4 would contribute disproportionately to any cost avoidance achieved, we also assessed overall Tier 4 program reach, overall Tier 4 costs, and utilization trends for Tier 4 super-utilizers.

RESULTS: The actuarial analysis confirmed that baseline Medicaid per member per month (PMPM) costs increase by risk strata: Tier 1 (\$343.71 PMPM); Tier 2 (\$814.05 PMPM); Tier 3 (\$2887.07 PMPM); Tier 4 (\$7741.93 PMPM). Preliminary actuarial findings based on the first 11 months of program data estimated a 2.7 % overall reduction in Medicaid spending—driven primarily by a 6.1 % reduction in Tier 4 spending—relative to the prior (baseline) year’s spending, adjusted for inflation.

CONCLUSIONS: Improved precision in targeting of intensive care coordination services to adult patients most likely to benefit may enable self-sustaining care models that result in reduced hospitalization and lower overall health care costs.

PATIENT TEACHER IN PATIENT SAFETY: LEARNING ALONGSIDE PATIENTS AND FAMILIES William Martinez²; David Browning³; Pamela Varrin³; Barbara Sarnoff¹; Sigall K. Bell¹. ¹BIDMC, Boston, MA; ²Vanderbilt University Medical Center, Nashville, TN; ³Boston Childrens, Boston, MA. (Tracking ID #2201064)

BACKGROUND: Experts recommend engaging patients in safety efforts, but robust partnering experiences are limited. We developed a workshop on medical error disclosure and prevention bringing interprofessional clinicians together with patients/family members.

METHODS: A prepost survey design was used to evaluate the impact of workshops on concordance of clinician and patient/family views regarding error disclosure. Survey items utilized a 5-point Likert-scale from strongly disagree=1 to strongly agree=5.

RESULTS: Baseline surveys were completed by 96 % (53/55) of interprofessional clinicians who registered for workshops and 81 % (71/88) of patients/family members from two hospital advisory councils. Patient expectations regarding error disclosure were significantly different from clinician expectations across 72 % (8/11) of survey items. Regarding error disclosure, patients were more likely than clinicians to believe “patients want to know all the details of what happened” (mean, 4.72 v. 4.20, $p<0.001$), and less

likely than clinicians to believe “patients find explanation(s) more confusing than helpful” (mean, 1.64 v. 2.64, $p < 0.001$), and “patients no longer trust their doctor” (mean, 2.35 v. 3.10, $p < 0.001$). Presented an error vignette (antibiotic administered despite allergy with no immediate adverse effect), patients were more likely than clinicians to agree that the error should be disclosed (mean, 4.77 v. 4.30, $p = 0.005$), that the patient/family would want to know (mean, 4.63 v. 4.30, $p = 0.02$), and less likely to agree that the disclosure would do more harm than good (mean, 1.67 v. 2.14, $p = 0.02$). Following the workshop, patient and clinician expectations showed greater concordance, with differences between patient and clinician views across $< 50\%$ of expectation items, and no significant differences in the vignette responses. All patients (9/9) and 84 % (46/55) of clinicians completing the program felt comfortable discussing errors together and nearly all (96 %) clinicians reported patient/family participation was valuable to their learning. At 3-month follow-up, 79 % (30/38) of clinicians stated workshop participation helped to make their patient interactions more collaborative.

CONCLUSIONS: A workshop including patients/family members in error disclosure and prevention training is feasible and effective. Even with motivated, self-selecting clinicians, collaborative learning with patients/families highlights important differences in patient/clinician perspectives at baseline, and brings patient and clinicians views about disclosure closer together.

PATIENT-CENTERED MEDICAL HOME IMPLEMENTATION AND BURNOUT AMONG VA PRIMARY CARE EMPLOYEES. Joseph A. Simonetti³; Philip W. Sylling⁷; Karin M. Nelson²; Sandra Joos¹; David Mohr⁴; Idamay Curtis⁷; Leslie Taylor³; Chip B. Harvey⁷; Gordon Schechtman⁶; Stephan D. Fihn⁷; Christian D. Helfrich⁵. ¹Portland VA Medical Center, Portland, OR; ²University of Washington, VA Puget Sound, Seattle, WA; ³VA, Seattle, WA; ⁴VA Boston Healthcare System, Boston, MA; ⁵VA Puget Sound Healthcare System, Seattle, WA; ⁶Veterans Affairs Central Office, Milwaukee, WI; ⁷Veterans Health Administration, Seattle, WA. (Tracking ID #2198324)

BACKGROUND: Burnout is common among primary care staff and is associated not only with expressed intent to leave clinical practice but also less desirable patient and provider outcomes (e.g., depression). Patient-centered medical home (PCMH) models entail changes in primary care delivery, such as improvements in team functioning, that have been shown to be associated with lower burnout. In 2010, the VA began implementing a PCMH model, called the Patient-Aligned Care Team (PACT), at more than 900 primary care clinics. Previous studies of the PCMH's effect on burnout have produced mixed results, though a recent VA study reported lower staff burnout at sites with more effective PACT implementation. The aims of this study were to estimate the change in burnout prevalence among the VA primary care staff from 2012 to 2013, determine whether extent of clinic-level PACT implementation was associated with clinic burnout prevalence, and determine whether clinic-level progress in PACT implementation from 2012 to 2013 was associated with change in clinic-level burnout.

METHODS: We performed a retrospective analysis using data from the 2012 and 2013 VA All Employee Survey (AES), a human resources survey fielded annually to all VA employees (response rates 62.3 and 56.3 %, respectively). We included respondents who identified “primary care” as their main job role, responded to a question about burnout, worked in a clinic that had at least 1 respondent from each study year, and worked in one of four occupational categories that comprise the core PACT team: 1) primary care provider; 2) nurse care manager or registered nurse; 3) clinical associate (e.g., licensed practical nurse); or 4) administrative clerk. Primary outcomes were the change in overall VA primary care staff burnout prevalence from 2012 to 2013, clinic-level burnout prevalence, and change in clinic-level burnout prevalence from 2012 to 2013, which we assessed using a validated, single-item measure from the Physician Worklife Study that asked respondents to rate their level of burnout using a 5-level ordinal scale. Consistent with previous studies, we dichotomized burnout as absent (1–2) or present (3–5). To assess change in VA primary care burnout from 2012 to 2013, we aggregated respondent burnout to the clinic level and used linear regression with change in overall clinic-level burnout prevalence from 2012 to 2013 as the outcome. To assess the association between clinic-level PACT implementation and burnout, we used the PACT Implementation Progress Index (PI²), a validated metric measuring implementation among VA clinics. Clinic PI² scores range from –8 to 8; higher scores indicating more extensive PACT implementation, which we categorized by tertile. We used linear regression to model clinic-level burnout prevalence in 2013 as a function of 2012 clinic PI² scores and to model change in clinic-level burnout prevalence from 2012 to 2013 as a function of change in clinic-level PACT implementation between years. Each model adjusted for differences in respondent and clinic characteristics.

RESULTS: Among 8135 and 7510 primary care respondents working in 421 VA clinics included in the sample from the 2012 and 2013 AES surveys, 33.0 and 36.5 % screened positive for burnout, respectively. After aggregating to the clinic-level and adjusting for differences in clinic and respondent characteristics between years, we estimated that the change in burnout among VA primary care staff from 2012 to 2013 was +5.0 % ($p < 0.01$).

In unadjusted and adjusted models, there was no association between extent of PACT implementation as measured by PI² and clinic-level burnout prevalence, or between change in clinic-level PACT implementation and change in clinic-level burnout between years.

CONCLUSIONS: Burnout among VA primary care employees is high, and increased from 2012 to 2013. The extent to which clinics had implemented the PACT model in 2012 and their implementation progress from 2012 to 2013 were not associated with clinic-level burnout. While medical home models, including PACT, may prove to lower burnout among the primary care workforce, their effectiveness in doing so in the short-term remains unclear.

PATIENT-REPORTED BARRIERS TO SHARED DECISION-MAKING (SDM): TARGETS FOR BEHAVIORAL INTERVENTION Joseph Plaksin²; Sarita Kundrod²; Helen Hu³; Andrew B. Wallach¹; Sondra Zabar²; Adina Kalet²; Lisa Altschuler². ¹Bellevue Hospital, New York, NY; ²NYU School of Medicine, New York, NY; ³New York University, New York, NY. (Tracking ID #2184550)

BACKGROUND: Type 2 diabetes mellitus (DM) affects an estimated 12.5 % of adults in New York City (NYC), and diabetes-related complications account for 50 % of all hospital beds in the city. Patients with DM who take an active role in their healthcare and participate in shared decision-making (SDM) with their healthcare providers (HCPs) are better able to accomplish their management goals and maintain their health. However, due to patients' perceptions of their role, desires to be a “good patient,” and the difference in knowledge and power between patients and HCPs, many patients do not feel empowered to take an active role in their medical care. We aim to develop a Patient Empowerment Program (PEP) that will reframe the roles of the patient and HCP and democratize the patient-HCP relationship so patients can fully participate in SDM. To inform intervention development, we conducted a qualitative study to explore patient 1) experiences in HCP offices that facilitate or impede participation in SDM, 2) difficulties with diabetes care, and 3) willingness to participate in PEP.

METHODS: Patients with DM were recruited from Primary Care clinics at three public hospitals in NYC that primarily serve a low-income, low health literacy population. Eligibility criteria included English-speaking adults who have had DM for at least 1 year with a current hemoglobin A1c between 6.5 and 9 %. The initial interview questions were revised after the first 2 focus groups in order to better address all relevant topics of discussion. After completing 6 focus groups, no new significant themes emerged. All sessions were audio-recorded and transcribed by a professional company. Two independent coders reviewed one segmented transcript to develop a coding schema, then met to negotiate a finalized set of codes that were applied to the remaining transcripts. Dedoose software was used to assist with coding and thematic analysis.

RESULTS: We recruited 46 patients to participate in the focus groups, 30 were scheduled to attend, and 26 attended one of 6 focus groups. Participants were predominately female (62 %), and all were ethnic minorities, most commonly African-American or Hispanic. Other demographic and clinical information was not collected. Participants varied widely in terms of empowerment. Some felt comfortable taking charge of their healthcare and believed it was in their best interest to do so. One participant said, “if you help the doctor you help yourself. Go for your appointments, go for your blood work, and get involved. I noticed my blood sugar is better when I work with myself.” Others relied on their doctors to make decisions for them and believed the patient's role was to “go along because we're the patient” or “conform day-to-day by taking medication.” Thematic analyses focused on the communication and teamwork aspects of SDM and what helps or hinders participation in SDM. Participants initially reported overall positive experiences with doctors, stating they “felt at ease” with them or they know “if I need her, I can call her.” But, after further questioning, they were able to discuss negative experiences with doctors who did not communicate well, stating “it was like she didn't hear me” or “they will give you drugs without telling you the side effect[s].” Some were sympathetic to doctors, realizing that “they never say they're rushing but you can sense it.” But for others these difficulties led them to feel disengaged and frustrated to the point where they would refuse medication. One participant said “when the doctor says you need this or that, and gives me a lot of pills—I am not taking all [of] that.” Despite these concerns, very few participants reported changing doctors in order to find one they could have a better relationship with. Participants were also able to recognize communication issues from their own perspective, particularly when it came to diabetes. Multiple participants reported that they “didn't think [they were] sick” or that it took “a long run for them to start understanding how serious their condition [was],” usually after they began experiencing symptoms or, in one case, had a stroke. Thematic analyses also showed common difficulties with the daily aspects of diabetes care, but many participants did not tell their doctors for varying reasons, such as not knowing that financial difficulties were something they could discuss with their doctor, believing their doctor was too busy, or not believing the doctor would be receptive to their concerns.

CONCLUSIONS: Patients from a low-income and low health literacy population are able to recognize differences in HCP communication skills and discuss how behaviors of patients and HCPs are barriers to SDM. These results suggest that PEP can give patients concrete skills to communicate better with their HCPs, which can increase participation in SDM and empower patients to become active participants in their healthcare.

PATIENT-REPORTED DISCHARGE READINESS IS NOT ASSOCIATED WITH POST-DISCHARGE ADVERSE EVENTS: A PROSPECTIVE COHORT STUDY Darren Lau; Raj S. Padwal; Sumit R. Majumdar; Jenelle Pederson; Sara Belga; Sharry Kahlon; Miriam Fradette; Debbie Boyko; Finlay A. McAlister. University of Alberta, Edmonton, AB, Canada. (Tracking ID #2196826)

BACKGROUND: Readmissions to hospital after discharge are frequent, but clinicians are inaccurate at predicting in whom they will occur. We examined whether patients may be able to judge their own readiness for discharge using a gold standard of readmission or death at 30 days.

METHODS: We performed a prospective cohort study of adult patients discharged home from general internal medicine wards in Edmonton, Alberta, from 2013 to 2014. Patient-reported discharge readiness was measured using an 11-point Likert scale, with "readiness" defined by a score ≥ 7 . Discharge readiness and other covariates (including the LACE index for readmission risk, PHQ-9, GAD-2, and EQ-5D scores) were assessed at the time of discharge by structured personal interview.

RESULTS: Of 495 patients (mean age 62 years, 51 % female), 383 (77 %) reported being ready for discharge. Patients reporting being ready for discharge were less depressed and less anxious, and had fewer previous hospitalizations and greater perceived health status despite being older and having more comorbidities. At 30 day follow-up, 96 patients (19 %) had been readmitted or died, with no significant difference between those who reported they were ready for discharge (20 %) and those who reported they were not (19 %, $p=0.84$), even after multivariate adjustment (aOR 1.19, 95 % CI 0.66–2.15). Variables associated with a higher risk of readmission or death included the LACE index and depressive symptoms.

CONCLUSIONS: Patient reported discharge readiness was not associated with risk of readmission or death in the first 30 days after discharge. Future efforts should focus on improving interdisciplinary team assessments of discharge readiness using objective measures.

PATIENT-REPORTED MEDICATION ADHERENCE BARRIERS AMONG VETERANS AFFAIRS PATIENTS WITH CARDIOVASCULAR RISK FACTORS Leah L. Zullig^{3, 5}; Karen Stechuchak⁴; Karen M. Goldstein¹; Maren Olsen⁴; Felicia A. McCant⁴; Susanne M. Danus⁴; Matthew Crowley²; Eugene Oddone⁴; Hayden BOSWORTH⁴. ¹Durham VA; Duke University, Durham, NC; ²Durham VAMC, Durham, NC; ³Durham Veterans Affairs Medical Center, Durham, NC; ⁴Durham VA Medical Center, Durham, NC; ⁵Duke University, Duke, NC. (Tracking ID #2197594)

BACKGROUND: Cardiovascular disease (CVD) is a leading cause of morbidity and mortality in the United States. In addition to lifestyle changes, medication management is often required to control CVD risk factors. Many patients experience barriers making it difficult to take CVD risk factor-related medications as prescribed. The Cardiovascular Intervention Improvement Telemedicine Study (CITIES) was a tailored behavioral pharmacist-administered, telephone-based intervention for reducing CVD risk (ClinicalTrials.gov Identifier: NCT01142908). Our objectives were to: 1) describe patient-reported barriers to taking their medication as prescribed; and 2) evaluate patient-level characteristics associated with reporting medication barriers.

METHODS: We recruited patients receiving care at Durham Veterans Affairs Medical Center-affiliated primary care clinics. Eligible patients had poorly controlled hypertension and/or hypercholesterolemia as defined as blood pressure of $>150/100$ mmHg and/or low-density lipoprotein value >130 mg/dL. At the time of enrollment, patients completed an interview asking 7 questions derived from a validated measure of medication barriers. We describe patient characteristics and individual medication adherence barriers. We then use multivariable linear regression to examine the association between a medication barrier score and patient characteristics, including health literacy, financial status, and social support, among others.

RESULTS: Most patients ($n=428$) were married or living with a partner (57 %), were male (85 %), and had a diagnosis of both hypertension and hyperlipidemia (64 %). Nearly 57 % of the sample endorsed at least one barrier. The most commonly reported barriers were having too much medication to take (31 %) and forgetting whether medication was taken at a particular time (24 %). In adjusted analysis, those who were not employed (1.32; 95 % CI 0.50–2.14) or did not have someone to help with household tasks if needed (1.66; 95 % CI 0.42–2.89) reported higher medication barrier scores. Compared to those diagnosed with hypertension and hyperlipidemia, those with only hypertension (0.91; 95 % CI 0.04–1.79) reported higher medication barrier scores.

CONCLUSIONS: Despite access to low-cost or free medications in the VA healthcare system, barriers to medication adherence were common in this sample of veterans at high-risk for cardiovascular disease. Screening for medication barriers, including an evaluation of sociodemographic characteristics such as employment status and lack of adequate social support, may help identify patients at risk for potential adherence problems. Tailored scalable interventions that address medication barriers will be essential to continue decrease the impact of cardiovascular disease in this population.

PATIENTS' PERSPECTIVES ON TAPERING OF CHRONIC OPIOID THERAPY: A QUALITATIVE STUDY Joseph W. Frank^{1, 2}; Karen Mellis¹; Susan L. Calcaterra^{1, 3}; Steve Koester⁴; Daniel Matlock¹; Cari Levy^{2, 1}; Ingrid A. Binswanger^{1, 5}. ¹University of Colorado School of Medicine, Aurora, CO; ²VA Eastern Colorado Health Care System, Denver, CO; ³Denver Health Medical Center, Denver, CO; ⁴University of Colorado Denver, Denver, CO; ⁵Kaiser Permanente Colorado, Denver, CO. (Tracking ID #2198192)

BACKGROUND: There is inadequate evidence of long-term benefit and growing evidence of harms of chronic opioid therapy (COT) in the management of chronic pain. As many of these risks increase in a dose-dependent manner, opioid dose reduction, or opioid tapering, may reduce the risks of COT. However, little is known about patients' experiences during and after opioid tapering. We sought to explore patients' perceptions of barriers to and facilitators of opioid tapering.

METHODS: We conducted a qualitative study of patients with current or recent experience with chronic opioid therapy for chronic pain ($N=12$). We recruited patients from primary care settings in two medical centers: an urban, safety-net medical center in Denver, CO and an academic medical center in Aurora, CO. Inclusion criteria included self-reported musculoskeletal pain ≥ 6 months duration, age ≥ 18 years old and fluency in English. We used a purposive sampling strategy to recruit patients both with and without experience with opioid tapering (i.e. ongoing COT, current opioid taper or opioid discontinued within prior 3 years). We conducted semi-structured, audio-recorded interviews. We analyzed transcribed interviews using a team-based, mixed inductive and deductive approach, guided by Social Cognitive Theory and the Transtheoretical Model. We iteratively refined emerging themes in consultation with an advisory group consisting of experts in opioid medications, palliative care and medical decision-making.

RESULTS: Participants had a mean age of 57 years old, were 33 % male and 75 % White. Two participants (16 %) were on COT and not tapering, 7 patients (59 %) were currently tapering COT, and 3 (25 %) had discontinued COT. Seven participants (58 %) were recruited from the academic medical center, and 5 from the urban, safety-net hospital. We identified 3 main domains related to the experience of opioid tapering: Opioid withdrawal, patient-provider interactions, and outcomes after tapering. First, participants emphasized the central role of opioid withdrawal symptoms in both COT and opioid tapering. Experiences with opioid withdrawal coalesced around 3 subdomains: Intensity of withdrawal symptoms, fear of future withdrawal, and withdrawal as a barrier to dose reduction. Second, participants described both the importance of a relationship with a trusted physician as well as the potential for patient-provider conflict when discussing opioid tapering. Finally, participants with experience with opioid tapering recounted largely positive outcomes following opioid tapering.

CONCLUSIONS: Patients' experiences identified both barriers to and facilitators of opioid tapering in the context of COT for chronic pain. Patients' expectations prior to opioid tapering focused on withdrawal symptoms and increased pain while experiences after tapering were largely positive. Future efforts to support opioid tapering should elicit perceived barriers to tapering and should be prepared to manage opioid withdrawal symptoms during tapering. Further trials

are needed to elucidate the impact of opioid tapering on patient-reported outcomes such as pain and function.

Representative Quotes of Main Domains

Domain	Representative quote
Opioid withdrawal	
Intensity of withdrawal	"I don't think they're aware of how bad withdrawals are. I mean there's vomiting bile. There's stomach cramps, there's the cold shakes and fever...I mean it's pretty bad even from somebody that's just on them for a few months and then stops."
Fear of future withdrawal	"I also had lots of fears about, let's say, there was an apocalypse in our society. What would happen to me? Where would I get my medication from? I would get so sick not having those drugs 'cause I was physically dependent on these drugs'
Barrier during tapering	"I go through the withdrawal from these drugs every time I taper a little. I just can't believe the power, and the drugs actually talk to me in my mind... The drugs are actually saying, don't do it, don't do it."
Patient and provider interactions	
Importance of trust in prescriber	"I think I would have trusted her and I think I would have started tapering if she would have said, I really want you to try tapering."
Potential for conflict	"I would be offended, you know, because to say I should just decrease my dose means that my pain is not real."
Outcomes after tapering	
Pain	"It's not much worse without the medication as it is with it. After you've taken it for a while, it doesn't do any good. That's what I've found. But that's hard to convince people of it. They look at me like I'm nuts. But it's true. I mean my pain is not any more severe than it was when I was taking all that stuff."
Function	"I am more alert since I stopped taking [OxyContin] and I need less sleep, which is a blessing. So I'm able to do more things with my life."

PATIENTS' EXPERIENCES MANAGING CARDIOVASCULAR DISEASE RISK FACTORS IN PRISON Emily H. Thomas¹; Emily A. Wang¹; Leslie Curry²; Peggy G. Chen³. ¹Yale School of Medicine, New Haven, CT; ²Yale School of Public Health, New Haven, CT; ³RAND Corporation, Santa Monica, CA. (Tracking ID #2197876)

BACKGROUND: More than two million individuals are incarcerated in U.S. correctional facilities. Prisoners disproportionately suffer from many chronic conditions, including hypertension, diabetes, and cardiovascular disease (CVD). The most common cause of death amongst prisoners is CVD, and prisoners, in the 2 years post release, are twice as likely to die from CVD as matched peers in the community. Despite the greater risk of CVD mortality in patients with a history of incarceration, little is known about how correctional settings confer this risk and how risk factors for CVD are managed in prison. We elicited patients' perspectives about how correctional systems support CVD management and self-care practices to inform future interventions that may realign constraints of the correctional system with best practices for chronic care.

METHODS: To assess patient experiences with chronic disease management, we conducted 26 semi-structured, in-depth interviews with a purposeful sample of men and women who had been released from prison within the prior 6 months. All participants had CVD or a CVD risk factor (diabetes, hypertension, hyperlipidemia, or obesity). In accordance with grounded theory, we inductively generated themes about chronic disease care, access, and supports in the correctional setting. Our interdisciplinary team coded the transcripts independently, and in weekly group meetings, we negotiated consensus in coding interpretations. Data collection and analysis occurred iteratively using the constant comparative method to refine themes and to allow for unifying themes to emerge from interview transcripts.

RESULTS: Four themes emerged about CVD management and self-care practices: (1) Access to care for chronic conditions is present, yet complicated in the correctional setting. An acute care paradigm and barriers to care, including non-medical gatekeepers, application-based triage, and copays, detract from continuity in prisoners' care for chronic conditions. (2) Patient-provider partnerships can be undermined by providers' competing correctional and medical roles. For example, participants report that providers may issue punitive tickets or send patients to solitary confinement for medication non-adherence. A

mutual distrust between patients and providers may follow and impair collaboration to individually tailor care. (3) Informal support systems through peers in prison and family members in the community can fill gaps in the system and facilitate self-management education and skills development. (4) The trade-off between prisoner security and patient autonomy influences opportunities for self-management. As a result, prisoners may not acquire skills for medication self-administration, self-injecting insulin, self-monitoring, and complication management that are crucial to self-care upon re-entry to the community.

CONCLUSIONS: CVD management may be improved by shifting the medical care paradigm in prison from acute "sick visits" to routine chronic disease monitoring; clarifying and separating the correctional and medical roles of health care providers; strengthening informal partnerships for peer-led education; and creating more opportunities for practice of self-management skills. Future interventions should explore ways that prisoners can practice chronic disease management and receive provider feedback on medication adherence, self-monitoring, and complication management while minimizing punitive correctional oversight. These interventions should be targeted to improve not only clinical outcomes in the correctional setting, but also transitions of care from the correctional setting to the community.

PATIENTS' FEELINGS OF BEING UNDERSTOOD BY THEIR PHYSICIAN MEDIATES THE ASSOCIATION BETWEEN HEALTH BELIEFS AND MEDICATION ADHERENCE Pablo Buitron de la Vega; Chieh Chu; Nancy R. Kressin. Boston Medical Center / Boston University, Dorchester, MA. (Tracking ID #2198855)

BACKGROUND: Poor adherence to antihypertensive medications continues to be a major challenge for chronic disease management. Patients' beliefs and health literacy can interfere with adherence; studies show that greater concerns about medications, less belief in their necessity and lower health literacy are associated with poor adherence, and better doctor-patient relationships are generally associated with better adherence, though less is known about how feelings of being understood by one's physician may influence adherence. Rarely have the effects of this array of factors, together with other known socio-demographic influences (age, sex, race) on adherence, been examined simultaneously. The aim of our study is to understand the association between health beliefs and medication adherence in adult patients with hypertension, controlling for the known effects of sociodemographics (age, sex, race and health literacy), and to understand whether the patient's perception of being understood by the physician mediates that association.

METHODS: This study is a secondary analysis of a cross-sectional study done in 2004 that included adult hypertensive white and black patients from the primary care clinics of an urban safety-net hospital. Patients' characteristics were obtained from a questionnaire administered after the clinic encounter and from the patient's electronic medical record. The "Beliefs about medicines questionnaire" was used to assess concerns about medications and beliefs in the necessity of medications. To assess medication adherence, we used the "Hill-Bone compliance to high blood pressure therapy scale". The REALM- short form was used to assess patient's health literacy. An additional item assessed patients' perceptions of the degree to which they felt understood by their physician. A bivariate analysis was used to determine which of the independent variables: concerns about medications, beliefs in the necessity of medications, patient's perceptions of being understood by their physician and socio-demographics (health literacy, race, gender and age), were associated with medication adherence. We used the independent variables that were significantly associated on the bivariate level (excluding patient's perceptions of being understood by their physician), to conduct a multiple linear regression analysis and examine their simultaneous association with medication adherence. Then, we added patients' perceptions of being understood by their physician into the multiple linear regression analysis to examine its mediating effect on the association between health beliefs (concerns about medications and beliefs in the necessity of medications) and medication adherence.

RESULTS: Eight hundred six hypertensive patients were included in the analysis. Sixty-five percent were females, 57 % black and the overall mean age was 59 years. In the bivariate analyses, we found that greater concerns about medications, less beliefs in the necessity of medications, more negative patient's perceptions of being understood by their physician, poor health literacy, black race, female gender, and younger age were associated with poor medication adherence (all p's <0.05). The multiple linear regression analysis showed that less belief in the necessity of medications and greater concerns about medications were significantly associated with poor medication adherence after adjusting for socio-demographics (age, gender, race, health literacy). Finally, the inclusion of patients' perceptions of being understood by their physician into the multiple linear regression, eliminated the significant effect of concerns about medication on adherence.

CONCLUSIONS: Patients' positive perceptions of being understood by their physician can ameliorate the negative impact of concerns about medications on adherence. This

finding underscores the importance of physician empathy and patient-centered care, oriented towards understanding each individual patient and their needs and goals for care.

PERCEPTION AND UNDERSTANDING OF OVERUSE OF MEDICAL RESOURCES BY HOUSESTAFF AND FACULTY AT AN ACADEMIC MEDICAL CENTER Erik Bartholomew; Brandon Combs. University of Colorado, Denver, CO. (Tracking ID #2200584)

BACKGROUND: Growing concern about the unsustainable growth in health care spending and the potential harms from unnecessary medical care has spurred interest in educational initiatives focused on teaching value to medical trainees. To our knowledge, no data exist regarding resident perceptions on the scale of low value care and ability to recognize medical overuse in the inpatient setting. Using the Right Care survey, we aimed to better understand these issues among residents at a large academic medical center to guide further development of high value care curricula aimed at reducing medical overuse.

METHODS: Resident physicians in internal medicine and family medicine at the University of Colorado were recruited by email to respond to a 10 item survey via Survey Monkey. The Right Care survey comprised questions meant to assess perceptions of the scale of overuse in the inpatient setting, its drivers, and how it manifests. Data were compiled anonymously.

RESULTS: Sixty-five of 204 residents completed the right care survey (response rate 32 %). Participants were evenly split between PGY1-3 levels of training. Fifty-nine percent of participants appropriately recognized medical overuse in a given scenario. Among a list of frequently ordered tests and imaging studies, "sometimes" was most commonly selected when asked how often each intervention was likely to influence management. Sixty-four percent of participants felt that tests and procedures unlikely to influence management were ordered daily. The most important perceived drivers of such interventions were supervisor expectation and diagnostic uncertainty. Sixty-five percent felt that up to 10% of tests and procedures were performed on patients, who if fully informed, would have declined them. Only 34 % of respondents "agreed or strongly agreed" that they fully consider patient preferences when ordering a test or study. Seventy percent of respondents indicated desire for their training program to devote more time to teaching about medical overuse.

CONCLUSIONS: Our study suggests that residents in internal medicine and family medicine believe that medical overuse and the provision of low value care in the hospital are common though recognition may be difficult. Encouraging clinicians to point out low value care when it occurs may help with trainee recognition. Since important drivers of overuse appear to be attending expectations and diagnostic uncertainty, educational efforts may need to target senior clinicians and promote a culture that embraces uncertainty. Limitations include single center study so results may not be applicable to other institutions.

PERCEPTIONS OF AFFORDABILITY OF CARE AND ACCESS TO INFORMATION ABOUT HEALTH INSURANCE AMONG IMMIGRANTS AFTER MASSACHUSETTS HEALTH REFORM Ye Jin Kang²; Danny McCormick³; David Bor¹; Leah Zallman¹. ¹Cambridge Health Alliance, Cambridge, MA; ²Harvard Medical School, Houston, TX; ³Harvard Medical School / Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2198825)

BACKGROUND: Under the Affordable Care Act (ACA), immigrants are eligible to gain insurance through Medicaid expansion and subsidized private insurance, although undocumented and legally present immigrants in the US for <5 years will continue to be barred from federally sponsored coverage, including Medicaid. Because immigrants often have limited financial resources, concern about the affordability of care under the ACA remains a concern. In addition, because of limited English language proficiency and limited experience with the US health care system, accessing information about newly available health plans could be a particular challenge for some immigrants. The ACA was modeled on Massachusetts' (MA) 2006 health reform law. Thus, although the MA law covered some low-income legally residing immigrants who are not eligible under that ACA, the MA reform may serve as a bellweather for immigrants' experiences with national health reform, begun only 1 year ago. Despite MA's efforts to provide insurance to immigrants, no studies have investigated immigrants' experience with perceptions of affordability of care or knowledge of insurance under MA health reform.

METHODS: Between August 2013 and January 2014, we conducted face-to-face surveys in four languages of a convenience sample of 1306 (response rate of 81 %) patients in three Emergency Departments at the 2nd largest safety net institution in MA. We interviewed 647 immigrants and 664 US-born patients with private (commercial) insurance, no insurance, Medicaid and Commonwealth Care, subsidized insurance made available under the MA reform to low income individuals (including legally residing immigrants). We assessed knowledge about insurance and views on affordability of care

and insurance. We determined the percentage of immigrants and non-immigrants experiencing each outcome and then performed comparisons using chi square analyses. We also conducted multivariable logistic regression analyses to adjust for age and gender.

RESULTS: Immigrants reported higher levels of financial burden than did non-immigrants; they were more likely to report that they could not afford basic needs due to medical bills (17 % vs 12 %, $p=0.0163$) and more likely to be worried about the cost of their current hospital visit (36 % vs 22 %; $p<0.0001$). Immigrants reported more difficulty affording their insurance (14 % vs 9 %, $p=0.0141$) and were more concerned about paying their premiums (28 % vs 11 %, $p=0.0003$). Immigrants were also less likely to know their copayment for regular doctor visits and medications (44 % vs 58 %, $p=0.0002$), less likely to have received insurance information in their primary language (29 % vs 1 %, $p<0.0001$), and more likely to report that signing up for insurance would be easier with fewer plans (50 % vs 33 %, $p=0.0187$). Among those with any chronic disease, immigrants reported no more cost-related barriers to seeking medical care (28 % vs 30 %, $p=0.6294$). Overall, adjustment for age and gender did not alter the findings.

CONCLUSIONS: Despite efforts to provide affordable insurance and information for all residents under MA health reform, immigrants continued to report more difficulty affording and understanding their insurance, though no higher cost-related barriers to care, as compared to non-immigrants. Our findings suggest that disparities in affordability and knowledge about insurance may persist for immigrants insured under the ACA. While some ACA measures—such as increased funding for insurance navigators—could help alleviate the disparities identified here, our study highlights the need for careful monitoring of and likely additional provisions to reduce disparities and improve immigrants' experiences affording care.

PERCEPTIONS OF AUTONOMY IN INTERNAL MEDICINE, PEDIATRICS, AND COMBINED INTERNAL MEDICINE-PEDIATRICS Alexandra E. Mieczkowski³; Allen Friedland¹; Robert J. Habicht⁴; Reed Van Deusen²; Alda Maria Gonzaga². ¹Christiana Care Health System, Newark, DE; ²University of Pittsburgh, Pittsburgh, PA; ³University of Pittsburgh Medical Center, Pittsburgh, PA; ⁴University of Maryland School of Medicine, Baltimore, MD. (Tracking ID #2195687)

BACKGROUND: Many Internal Medicine (IM) programs assist in training combined Internal Medicine-Pediatrics (MP) residents. MP residents must negotiate the domains of two separate specialties including differing expectations of supervision and autonomy, both essential aspects of training. It has been shown that MP residents perceive significant differences in the autonomy they experience in the two specialties, with MP residents more likely to agree that they receive appropriate autonomy while on IM rotations. Previous research has also shown that MP residents are more likely to agree that they receive too little oversight on IM compared to pediatrics. It is not known whether categorical peers share MP residents' perceptions, or how resident perceptions compare to those of faculty.

METHODS: Three institutions with IM, Pediatrics, and MP training programs agreed to participate: (University of Pittsburgh Medical Center (UPMC) and Children's Hospital of Pittsburgh, University of Maryland Medical Center, and Christiana Care Health System and Nemours/DuPont Children's Hospital). An online survey previously developed for use with MP residents was modified and pilot-tested on faculty and chief resident volunteers. Categorical IM and pediatrics residents received a survey with specialty-specific questions. MP residents received a survey containing identical question blocks for both specialties. The block with which a combined respondent began the survey was randomized in an attempt to avoid bias within the MP respondents. A similar procedure was taken for faculty, with the exception of dual-trained faculty who were only provided questions for both specialties if they consistently attended on both specialties. The study was approved as IRB Exempt by UPMC. Data was analyzed descriptively and where appropriate with t tests using Stata 13.1.

RESULTS: MP residents perceived significant differences in the autonomy they received between the two specialties. MP residents were more likely to agree that they received an appropriate level of autonomy while on IM rotations, with a mean score of 4.3 on 5 point Likert scale (1=strongly disagree, 5=strongly agree), relative to pediatric rotations (mean of 2.7, $p<0.001$). There was no difference in the general perception of MP residents compared to their IM peers (means 4.3 and 4.4, $p=0.47$), which is in contrast to a significant difference between the perceptions of MP residents to their pediatric resident peers (means 2.7 and 4.0, $p<0.001$). IM and MP residents (means 2.1, 2.5) in turn had similar perceptions of their autonomy compared to their categorical IM and MP faculty (means 2.4, 2.6) who attend on the generalist wards (p values >0.05). However, MP residents were significantly more likely to agree that they received too little oversight on IM relative to their categorical peers (means 2.5 and 2.1, $p=0.008$).

CONCLUSIONS: MP residents generally had similar perceptions of the level of autonomy they receive to their categorical IM peers and agreed they received an appropriate amount of autonomy, but were more likely to perceive too little oversight on the specialty than their categorical IM peers. These results may be related to the ability of MP residents

to directly compare between the two specialties, but further study is required to determine whether, how, and for whom the expectations of or practice of oversight should be modified.

PERCEPTIONS OF OPIOID-ASSOCIATED OVERDOSE RISK: A QUALITATIVE STUDY OF PRIMARY CARE PROVIDERS AND THEIR PATIENTS IN THE SAFETY NET. Emily E. Hurstak; Margot Kushel; Christine Miaskowski; Jamie Chang; Rachel Ceasar; Kara Zamora; Kelly Knight. University of California San Francisco, San Francisco, CA. (Tracking ID #2196915)

BACKGROUND: Chronic Non Cancer Pain (CNC) is pain that persists longer than 3 months that is not caused by a malignancy nor related to pain at the end of life. CNC is prevalent and is more common in individuals with a history of a substance use disorder (SUD). Individuals with a SUD are known to be at higher risk for opioid analgesic misuse, but they are also more likely to receive opioids for the management of CNC. The risk of opioid-related overdose in this population is a particular concern to clinicians and regulatory agencies. Risk for overdose is higher in those with a history of a SUD due to opioid misuse and the synergistic effects of alcohol, illicit substances, and opioid analgesics.

METHODS: Pain Management in the Clinic and the Community (PMCC) is a multi-modal qualitative study examining primary care providers' (PCPs) and patients' pain management practices in diverse safety net healthcare settings. Study staff conducted in-depth qualitative interviews with 23 PCPs (MD, nurse practitioner or physician assistant) recruited from six safety-net clinics across four counties in the San Francisco Bay Area. The study enrolled 1-5 patients of each PCP to create patient-PCP dyads. Patient enrollment criteria included: having CNC managed by the PCP and having a documented past or current history of a SUD. Interviews were digitally recorded, transcribed, and coded and entered into ATLAS-ti qualitative data management software. Major themes were identified using grounded theory methodology. We qualitatively describe PCP and patient perspectives on opioid-associated overdose risk and clinic safety strategies to reduce risk.

RESULTS: Sixty-five percent of safety net PCPs were male. All clinical settings had implemented at least one of the following strategies to reduce risk of opioid misuse and overdose: pain agreements, dose limitations on prescribed opioids, urine toxicology screening, and the prescription of intranasal naloxone. PCPs repeatedly identified the risk of opioid analgesic-associated overdose as a key concern associated with the prescription of opioid analgesics to patients with substance use. Patients reported fewer concerns that opioid analgesics alone could lead to unintentional overdose. Instead, patients were concerned about the risk of physical dependence due to opioid analgesics and overdose due to illicit drugs. Both patients and PCPs described changes in clinic opioid policies as abrupt and, at times, punitive. Most PCPs described new clinic policies as supportive of their clinical pain management strategies, while they also expressed concern that patients may leave primary care or return to illicit drug use as result of limited access to opioid analgesics. Patient experiences with clinic policy changes ranged from perceptions of intense policing and racial discrimination to slight inconvenience and indifference. Both patients and PCPs expressed concerns about fairness while also the desire for care to be individualized.

CONCLUSIONS: Primary care providers in safety net clinics in the San Francisco Bay Area were more concerned about the risk of opioid overdose in patients with a history of substance use than were patients with SUD and CNC. While PCPs viewed clinic safety innovations and government policy changes as positive innovations for patient safety, both patients and clinicians had concerns about the unintended consequences of these policies. We found a disconnect between PCP and patient perspectives on overdose risk. If patients who are at high risk for opioid related overdose do not identify this hazard, clinic safety strategies around opioid overdose may be less effective. Future research is needed on improving patient education on the risks of opioid analgesic treatment for chronic non-cancer pain.

PERCEPTIONS OF SAFETY, EFFICIENCY, AND EDUCATION IN HOLD-OVER SIGNOUT: A QUALITATIVE STUDY Trevor Jensen; Jonathan Duong; Sasha Morduchowicz; Lekshmi Santhosh; Sarah Schaeffer; James D. Harrison; Bradley A. Sharpe; Sumant Ranji. University of California San Francisco, San Francisco, CA. (Tracking ID #2196899)

BACKGROUND: Signout of newly admitted patients from a night admitting physician to a primary team is common, making up roughly 40 % of admissions to the inpatient medical service at our hospital. Nevertheless, little is known about these "holdover" signouts, and there is no standardized format for ensuring they contain appropriate information transfer and maximize patient safety.

METHODS: We designed a qualitative study using focus groups and interviews of internal medicine (IM) residency leadership, hospitalists, and IM residents at our academic

tertiary care hospital. We used a standardized set of nine questions developed by the study investigators after review of signout literature. The questions explored participants' perceptions of the safety, efficiency and education of current holdover signout and elicited ideas about how to improve these domains. All sessions were audio recorded, transcribed, and analyzed by two investigators using content analysis.

RESULTS: We conducted three focus groups and eight structured interviews comprising 12 hospitalists and 15 residents. No significant differences were noted between resident and hospitalist opinions. Participants thought the purpose of holdover signout was safe and efficient transfer of patient care to a primary team. They noted that no formal framework exists for this signout at our institution and that presentation style varies. Participants thought that holdover signout was often inefficient due to repetition of information and poor logistics. Safety concerns were common, and involved unclear code status and severity of illness, delays in seeing patients, and poor medication reconciliation [Figure 1]. Formal education was rarely present. Participants agreed that holdover signout should use several best practices previously identified in the signout literature, including quiet location, minimal interruption, and verification of understanding and to-dos. Most thought that holdover presentations should be shorter than the traditional new patient history and physical, and should take fewer than 15 min. Most favored creating a standardized format that minimizes presentation of objective data that is available in the chart. Participants identified feedback on presentation skills and clinical reasoning as the most important educational opportunity.

CONCLUSIONS: Holdover signout is common, but minimal literature exists for this process. Our study found that holdover signout faces both common and unique challenges compared to other signouts and may benefit from some but not all established signout best practices. While our study was limited to a single academic center and residency program, our findings suggest that holdover signout may benefit from a unique standardized format.

Safety, Efficiency, and Educational Concerns with Holdover Admissions

FIGURE 1		
Categories	Subcategories	Subcategory Quotes
Based on literature Safety	Identified by content analysis	
	Delay in Seeing Patients	"Often times there is a big lag between when they get signed out and when they put in orders or call consults. That's what I worry about, particularly if there are more urgent concerns"
	Medication Reconciliation	"We assume that people have done an accurate med rec... but that is hard overnight... and then when things don't line up that's really confusing"
	Unclear severity of illness	"When you're the night team, it's just a really transient process... you don't really know them... things evolve... they were very stable and then they totally unraveled"
	Code Status	"We always mention code status... but I think there are instances where it isn't actually discussed much, and then was just assumed full code... and someone was really DNR/DNI... and that's a safety issue"
Efficiency	Repetitive information Logistics	"[The presentation] includes a lot of the data that is readily available on the computer and it can be looked up." "There are many teams who are receiving holdovers and different people handing off different things to different teams that I think the movement and coordination takes time."
Education	Process education Feedback Medical Teaching	"I think the education should really derive from teaching people how to make a presentation more succinct, more efficient while conveying the most important information." "As an attending, I am in a great position to give feedback on how the presentation was in terms of whether it meets my need as a person that's taking care of the patient now and whether any important information was missed from the presentation." "Sometimes we'll bring interesting articles to the table about how and why we approached specific care. And I think that's important for the resident and me or whoever is admitting the patient to share that information."

PHYSICIAN AWARENESS AND USE OF OVERTREATMENT GUIDELINES IN PRACTICE: A NATIONAL SURVEY OF US INTERNISTS

Kira L. Ryskina⁵; Eric Holmboe¹; Elizabeth C. Bernabeo²; Esther J. Kim⁵; Judy A. Shea⁴; Judith Long³. ¹ACGME, Philadelphia, PA; ²American Board of Internal Medicine, Philadelphia, PA; ³Philadelphia VA Center for Health Equity Research and Promotion, Philadelphia, PA; ⁴University of Pennsylvania, Philadelphia, PA; ⁵University of Pennsylvania, Philadelphia, PA. (Tracking ID #2199369)

BACKGROUND: Overtreatment guidelines that recommend against the use of tests and procedures have received increasing attention as a tool to reduce healthcare waste. Physicians' awareness and use of overtreatment guidelines and factors that influence those views are not well understood. We surveyed a national sample of internists on their views and practice of overtreatment guidelines, including factors that may influence their adoption, such as current practice and training characteristics.

METHODS: In July through September of 2014, we mailed a survey to a random sample of 1005 internal medicine physicians selected from the AMA Masterfile who completed residency within the last 10 years. The survey included questions about practice characteristics, training environment, overtreatment guidelines, and reported practice in hypothetical patient scenarios. Using factor analysis we developed a 9-item scale of residency cost-consciousness from physicians' perceptions of their residency training based on a number of characteristics. We then employed descriptive statistics to report physicians' views on overtreatment guidelines and multivariable logistic regression to test the associations between residency cost-consciousness, reported awareness and use of overtreatment guidelines, and hypothetical practice according to case scenarios.

RESULTS: Of the 441 (44 %) internal medicine physicians who returned the survey at the time of this submission, 41 % were in private practice and 65 % were salaried. Mean time from completing residency training was 6.7 years (SD 3.0). Most physicians discuss costs of care with patients: 42 % reported discussing costs "occasionally", 37 % "frequently", and 4 % "always". 88 % of physicians reported being familiar with overtreatment guidelines in their specialty and 80 % reported that the guidelines were useful in their practice. Compared to their current practice, 52 % of physicians reported that their practice style in residency was somewhat or a lot less cost-conscious while 19 % reported that their practice style in residency was somewhat or a lot more cost-conscious. There was considerable variation in physician training experiences related to costs of care: the mean residency cost-consciousness score was 27.1 (SD 5.3, range 10–41 out of 45). In residency, 37 % of physicians reported being exposed to teaching about cost-conscious care rarely or never, while 24 % reported frequent exposure. Compared to the bottom quintile, physicians who scored in the top quintile of residency cost-consciousness were more likely to bring up overtreatment guidelines in discussions with patients (OR=2.9, 95 % CI 1.2–7.2, $p=0.02$). Physician practice patterns measured using hypothetical scenarios based on current overtreatment guidelines varied (for example, 16 % of physicians reported never ordering antibiotics for acute mild-to-moderate sinusitis while 17 % reported ordering antibiotics for over half of their patients with the same presentation). Also, self-reported practice did not correlate with self-perceived use of overtreatment guidelines in practice or residency cost-consciousness.

CONCLUSIONS: The majority of US internists discuss costs of care with patients, but many report receiving scant training in this area during residency. Overtreatment guidelines are reported to be a useful tool in patient discussions. However, physician practice measured using hypothetical patient scenarios based on the guidelines does not appear to correlate with training factors or self-perceived use of guidelines.

PHYSICIAN-NURSE COLLABORATION IN A TERTIARY CARE ACADEMIC MEDICAL CENTER: DIFFERENCES BY PROFESSION

Georgia N. McIntosh; Darci Bowles; Reena H. Hemrajani; Nathan Schwartz; Miao-Shan Yen; Allison E. Phillips; Alan Dow. Virginia Commonwealth University, Richmond, VA. (Tracking ID #2196124)

BACKGROUND: A lack of effective physician-nurse collaboration has long been recognized to adversely impact patient and organizational outcomes. Despite substantial efforts towards developing strategies to improve interprofessional collaboration (IPC) in the acute care setting, consistent realization of this ideal remains elusive. Some studies have suggested that nurses and physicians have different perceptions of interprofessional collaboration and this lack of a shared mental model for interprofessional collaboration hinders improvement in this arena. We sought to evaluate for a difference in the perception of interprofessional collaboration between nurses and physicians and identify any potential contributing factors and barriers.

METHODS: Data were collected from 47 nurses, 29 housestaff physicians and 17 hospitalists providing care for medicine service patients in a large tertiary care academic medical center between June and November, 2014. Via an electronic survey, we gathered responses for the 14-item IPC scale, a reliable and valid measure of individual perceptions

of the level of collaboration in a healthcare environment. Each IPC item is scaled from 1–5 (strongly disagree—strongly agree). The IPC sum scores were calculated as the outcome variable (range: 14–70). Generalized linear models were used to correlate the IPC scores with the other variables. Pairwise comparisons were examined using Tukey's Honestly Significant Difference test (HSD).

RESULTS: Data analysis revealed an overall average IPC sum score of 47.87±9.60 (nurse: 42.8±8.68; housestaff: 53.81±7.08; hospitalist: 51.7±8.23). The result of the generalized linear regression indicated that the average IPC sum scores were significantly different by group ($F_{(2,90)}=18.9$, $p<.0001$). Pairwise comparisons revealed that the average sum score of nurses was significantly lower than either the housestaff physicians ($p<0.0001$) or hospitalist physicians ($p=0.0006$). Analysis also revealed that the average number of patients per day between the two physician groups (housestaff and hospitalist) and nurses were significantly different ($F_{(2,89)}=34.7$, $p<.0001$). A generalized linear regression was used for examination of the effect of number of patients per day on the IPC average sum scores. As the number of patients per day increased, IPC scores increased ($F_{(1,90)}=14.5$, $p=0.0003$).

CONCLUSIONS: While we observed that nurses had lower IPC scores than did the physicians, other results in the literature have found the opposite result. This variation suggests there may be unique environmental elements or influences impacting physician-nurse collaboration ratings in different settings. In addition, IPC scores increased with patient census, perhaps suggesting that busier practitioners rely more on collaboration. Given the known relationships between effective physician-nurse collaboration and superior patient and organizational outcomes, further examination of possible predictors of IPC scores is warranted, such as job satisfaction, characteristics of nurse and physician leadership, and geographic co-location of physicians with nursing units.

PHYSICIAN-PATIENT COMMUNICATION AND OUTCOMES: A MIXED METHODS STUDY

Surekha Bhamidipati¹; Seema Sonnad²; Daniel J. Elliott³; LeRoi S. Hicks³; Dr. Janine Jordan²; Patty McGraw²; Bailey Ingraham-Lopresto³; Elizabeth Ivey²; Edmondo Robinson². ¹CCHS, Newark, DE; ²Christiana Care Health Services, Newark, DE; ³Christiana Care Health System, Newark, DE. (Tracking ID #2198018)

BACKGROUND: Communication between physicians and patients around diagnoses and plan of care often is ineffective, leaving patients with incomplete knowledge about their care¹. This knowledge gap has appeared in studies of acute general medicine units². The impact of this gap on quality and efficiency outcomes has not been studied. Our goal was to assess hospitalized patients' knowledge of their care plan and examine the relationship between knowledge and outcomes.

METHODS: We prospectively enrolled a cohort of hospitalist's patients admitted to general medicine units. Patients and their hospitalists were separately interviewed on the second hospital day to assess patient knowledge of diagnosis scheduled tests and procedures and their planned discharge day compared to the same information from their physicians. Two reviewers graded physician and patient responses as none, partial or complete agreement for each plan of care, scheduled tests/procedures, and discharge date.

RESULTS: There were 84, 54 and 87 patients in the no, partial and complete concordance groups respectively, indicating that over one third of patients did not understand information received from their physician about diagnosis, plan of care and discharge date. The median LOS in the no concordance group was 3.9 days while in the combined partial or complete concordance group it was 2.2 days ($p=0.0001$). To account for the potential differences in the groups, we adjusted the LOS by case mix index when the index was available. This analysis included 73, 37 and 62 patients in the no, partial and complete concordance groups respectively. The median adjusted LOS for the no concordance group was 4.1 days and the partial and complete concordance group was 2.9 days ($p=0.03$).

CONCLUSIONS: Patient LOS is lower in patients who have greater knowledge of their plan of care. This difference remains after adjustment for illness severity. The causal pathway between patient knowledge and decrease in LOS is not clear. It is possible that patients who understand their plan of care are better prepared for discharge leading to a more efficient discharge. References: 1. Coran JJ, Koropecy-Cox T, Arnold CL. Are physicians and patients in agreement? Exploring dyadic concordance. *Health Educ Behav*. 2013;40(5):603–611. doi:10.1177/1090198112473102. 2. O'Leary KJ, Kulkarni N, Landler MP, et al. Hospitalized patients' understanding of their plan of care. *Mayo Clin Proc*. 2010;85(1):47–52. doi:10.4065/mcp.2009.0232.

PLEASE, DOC I NEED MEDICINE!: CAN RESIDENTS DIAGNOSE AND MAN-

AGE OPIATE USE DISORDER? Kathleen Hanley; Colleen Gillespie; Mrudula Naidu; Irina Nudelmann; Jennifer Adams; Mack Lipkin; Sondra Zabar. NYU School of Medicine, New York, NY. (Tracking ID #2198784)

BACKGROUND: Drug overdose was the leading cause of accidental death in 2012. Over 70 % of these deaths involved prescription opioids. In 2008, there were 14,800

deaths connected with prescription painkillers. In response to this epidemic, many states have implemented prescription-monitoring programs and guidelines for responsible prescribing are being promoted. We implemented a standardized patient case to assess our residents' approach to a patient seeking help for addiction to prescription opioids as a needs assessment for our addiction medicine curriculum.

METHODS: We incorporated into our annual 10 station performance based assessment (OSCE) a case involving a young woman with shoulder pain who exhibits many signs of opioid use disorder and whose hidden agenda is to get help for her addiction. Standardized patients evaluated residents using a behaviorally anchored checklist (response options: not done, partly done, well done) that included items assessing general communication and patient activation skills as well as items specific to this case including assessment of substance use, recognition of opioid use disorder, and treatment plan/next steps. Analyses include frequencies for specific items focused on opioid use and treatment as well as a post-OSCE survey administered to all the residents that assessed what they found challenging about this case. T tests were used to compare communication and patient activation performance (percent items rated as well done) on these cases with residents' overall performance on all cases.

RESULTS: Of the 24 residents who saw the case, 54 % asked what type and amount of pain medication the patient was taking but only 38 % discovered that the patient had also used heroin. Only 17 % assessed her use of alcohol, tobacco and other illicit drugs. In terms diagnosing an opioid use disorder, 42 % assessed for tolerance, 50 % for cravings and 71 % for withdrawal. However, only 17 % inquired about effects of opioid use on her social functioning and only 38 % determined that the patient had unsuccessfully attempted to cut back. Few (29 %) residents did a good job of explaining the diagnosis of opioid use disorder and guided her to an agreeable treatment plan. Only 4 % of SPs felt that the visit would help them to change their drug uses although 54 % felt it helped them recognize they had a problem and 67 % were motivated to change. Patient activation measures were uniformly poor with none of the SPs feeling that the doctor helped them feel confident that they could stop using opiates and only 13 % understanding the available treatment options. Patient activation scores were lower in the opiate case than for the rest of the cases (mean 8 % vs 38 % well done, $p < .001$) but overall communication scores were not significantly different ($p < .76$). SPs reported that more than half of the residents ran out of time and many of the residents reported that they found it challenging to directly explore opioid abuse.

CONCLUSIONS: Residents recognized the problem of opioid use disorder but did not perform a comprehensive assessment of the patient's substance use and lacked information and/or skills to counsel the patient on treatment options. Curricula need to be enhanced for residents to have the skills and confidence to treat and manage patients with this increasingly common and devastating substance use disorder.

POOLED ANALYSES OF RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDIES OF A BREATH POWERED NASAL DELIVERY SYSTEM CONTAINING 22 MG SUMATRIPTAN POWDER (AVP-825) IN THE TREATMENT OF EPISODIC MIGRAINE Roger K. Cady²; Per G. Djupesland³; Ramy A. Mahmoud⁴; John Messina⁴; Laszlo L. Mechtler⁵; Scott Siegert¹; Joao Siffert¹; Ken Shulman¹. ¹Avanir Pharmaceuticals, Inc., Aliso Viejo, CA; ²Headache Care Center, Springfield, MO; ³OptiNose AS, Oslo, Norway; ⁴OptiNose US Inc., Yardley, PA; ⁵Dent Neurologic Institute, Buffalo, NY. (Tracking ID #2188713)

BACKGROUND: AVP-825 is an investigational Breath Powered™ Bi-directional™ product containing low-dose sumatriptan powder (22 mg) that delivers drug to the mucosa beyond the nasal valve where it can be rapidly and efficiently absorbed. The purpose of these analyses was to evaluate the efficacy and safety of AVP-825 using pooled data from Phase 2 and 3 (TARGET, NCT01462812) placebo-controlled trials in adults with episodic migraines.

METHODS: Multicenter, randomized, double-blind, parallel-group, placebo-controlled studies in which a single migraine of moderate or severe intensity was treated with AVP-825 or an identical placebo delivery system. Headache severity scores were recorded pre-dose and at multiple timepoints through 48 h post-dose. Efficacy assessments included percentage of patients with pain relief, defined as reduction in headache severity score from severe (3) or moderate (2) to mild (1) or no pain (0), and rescue medication use through 48 h. Safety evaluation included adverse events (AEs).

RESULTS: The pooled population for efficacy analyses was AVP-825 ($n=143$) and placebo ($n=136$), and for safety was AVP-825 ($n=151$) and placebo ($n=150$). A significantly greater percentage of patients achieved pain relief with AVP-825 vs placebo at all timepoints from 30 to 120 min post-dose: 30 min (44.8 vs. 27.9 %, $P=.0052$), 60 min (60.1 vs. 36.8 %, $P=.0001$), 90 min (69.2 vs. 41.2 %, $P<.0001$), 120 min (70.6 vs. 44.9 %, $P<.0001$). Headache improvement was sustained through 48 h with AVP-825, including a lower rate of rescue medication use vs. placebo (35.7 vs. 54.4 %). The most common AEs (≥ 2 % of patients), generally transient and mild, were more frequent with AVP-825 and included abnormal taste (20 vs. 3 %), nasal discomfort (11 vs. 1 %),

rhinorrhea (5 vs. 2 %), and rhinitis (2 % vs. 0 %). Chest pain or pressure was not reported for any patient. One patient taking AVP-825 reported mild paresthesia, but there were no other triptan sensations reported. There were no deaths or serious AEs.

CONCLUSIONS: AVP-825 delivers low-dose sumatriptan and provides rapid headache relief that was sustained through 48 h, as demonstrated in placebo-controlled clinical trials. Treatment was well tolerated with predominantly mild and transient administration-site AEs. If approved, AVP-825 will constitute an important treatment option for patients with migraine.

POPULATION WELL-BEING AND GEOGRAPHIC DISPARITIES IN LIFE EXPECTANCY Anita S. Arora¹; Erica S. Spatz²; Jeph Herrin²; Carley Riley^{1,3}; Brita Roy³; Brian Wayda⁵; Elizabeth Rula⁶; Carter Coberley⁶; Harlan M. Krumholz⁴. ¹Yale-New Haven Hospital, New Haven, CT; ²Yale University, Charlottesville, VA; ³Yale University, New Haven, CT; ⁴Yale University School of Medicine, New Haven, CT; ⁵New York Presbyterian, New York City, NY; ⁶Healthways, Franklin, TN. (Tracking ID #2195159)

BACKGROUND: Geographic disparities in life expectancy across the United States are substantial, and not fully explained by race, socioeconomic status and physical health. Emotional well-being, a construct capturing emotional health and life evaluation, has previously been associated with mortality at the individual level, but a community-level association with life expectancy in a national population has not yet been studied. Understanding whether a population's emotional well-being is associated with life expectancy at the community level may help inform efforts to reduce geographic disparities in longevity.

METHODS: We assessed the association of emotional well-being with life expectancy at the county level ($N=3132$). We used the 2010 Gallup-Healthways Well-Being Index, a national survey of community-residing individuals ≥ 18 years. The construct of emotional well-being is captured by emotional health (index of 9 daily experiences and emotions plus diagnosed depression) and life evaluation (ranking of life situation now and 5 years from now), each measured on a scale of 0 to 100. Life expectancy estimates for men and women for 2009 were based on mortality data within each county. At the time of this analysis, well-being data was available at the congressional district (C.D.) level and was mapped to counties to match life expectancy estimates; 11 counties without life expectancy estimates were excluded. We assessed the distribution of life expectancy for men and women separately and stratified counties into quartiles based on life expectancy. We examined emotional health and life expectancy index scores across quartiles, along with county-level estimates of race (Census data), income (SAIPE) and education (American Community Survey) and three additional well-being domains included in the survey: basic access, physical health and healthy behaviors. We performed unadjusted and adjusted linear regressions of emotional health and life evaluation with life expectancy, adjusting for characteristics previously described.

RESULTS: County life expectancies ranged from 73 to 83 years for women and 63 to 82 years for men. County emotional health index scores ranged from 70 to 85 while life evaluation index scores ranged from 35 to 64. The mean emotional health score among counties in the lowest quartile of life expectancy was 77.2 compared to 80 in the highest quartile, for both women and men. The mean life evaluation score in all four quartiles only ranged between 47.5 and 48.5 for both females and males. Counties in the lowest quartile of female and male life expectancy were located in the South, had a high percentage of Blacks, and lower education and income compared with counties in the highest quartile of life expectancy, the majority of which were located in the Midwest. Emotional health and life evaluation were both significantly associated with female and male life expectancy at the county level. For every 1 point higher emotional health index at the county level, female life expectancy was 0.40 years higher and male life expectancy was 0.56 years higher ($p < .001$ for both). Similarly, a 1 point higher life evaluation index was associated with a 0.04 year higher female life expectancy and a 0.05 year higher male life expectancy ($p < .001$). When socio-demographic covariates (race, income, education and basic access) were introduced, the associations of emotional health and life evaluation with life expectancy reversed for females and became insignificant for males. Similarly, when adjusted for physical health and healthy behaviors, the associations of emotional health and life evaluation with life expectancy reversed for both males and females.

CONCLUSIONS: In this national study, emotional health and life evaluation were positively associated with life expectancy at the county level, but more research is needed to explore this complex relationship. Associations became insignificant or negative when socio-demographic and physical health covariates were introduced, perhaps because emotional well-being interacts with or mediates the effects of other covariates known to influence life expectancy. In addition, since congressional district level well-being data was mapped to counties, variation in well-being and the strength of associations were likely minimized. We intend to update these analyses with county-level well-being data, which will be made available within the next month; these analyses may more accurately describe the relationship between community emotional well-being and life expectancy. In

conclusion, emotional well-being may serve as a marker of life expectancy at the county level. Additional studies are needed to explore the relationship between emotional well-being and life expectancy within geographic and socially coherent communities.

POTENTIAL BENEFITS TO PATIENTS OF SHOPPING FOR PRESCRIPTION DRUGS FOR CHRONIC CONDITIONS Jeff Kullgren^{1, 2}; Joel E. Segel²; Chris Cheung²; Michael Slowik²; Simone Singh². ¹VA Ann Arbor Healthcare System, Ann Arbor, MI; ²University of Michigan, Ann Arbor, MI. (Tracking ID #2199247)

BACKGROUND: State governments, health insurance plans, and consumer groups are increasingly reporting health care price information to patients in the hopes of reducing cost-related access barriers for the growing number of Americans who face high out-of-pocket health care expenditures (e.g., through enrollment in high deductible health plans). However, little is known about how much money patients who face high out-of-pocket expenditures could anticipate saving by using price information to shop for routine services such as prescription drugs for chronic conditions, or about which patients could benefit most from using price comparison tools in their decision making.

METHODS: We conducted systematic searches of 4 state government operated websites (Michigan, Missouri, New York, and Pennsylvania) that publicly report retail prices for 6 drugs commonly prescribed to treat chronic conditions: Advair, atorvastatin, Lyrica, metoprolol, Nasonex, and Spiriva. For each state-drug combination we collected from a 25 % stratified random sample of ZIP Codes ($n=1330$) the number of pharmacies reporting prices within 5 miles of each ZIP Code centroid. When pharmacies reported retail prices, we collected data on the highest and lowest prices for a monthly supply of a commonly prescribed dose of the drug. In our analysis we used chi-square tests to compare how often pharmacies reported any price information across drugs within each state and across states for each drug. We then used Kruskal-Wallis tests to compare the median potential monthly out-of-pocket savings (defined as the difference between the highest reported retail price and the lowest reported retail price) across drugs within each state and across states for each drug.

RESULTS: Across the 24 state-drug combinations, retail price information was available for only 59 % of ZIP Codes with at least 1 pharmacy within 5 miles of the ZIP Code centroid. There was significant variation in the availability of prices ($P<0.001$ across drugs within each state as well as across states for each drug), ranging from 1 % for atorvastatin in Michigan to 77 % for Advair in Pennsylvania. When pharmacies reported retail price information for prescription drugs there was significant variation in median potential monthly out-of-pocket savings ($P<0.001$ across drugs within each state as well as across states for each drug), ranging from a minimum of \$24 [interquartile range (IQR) \$15–\$54] for Nasonex in Missouri to a maximum of \$159 (IQR \$113–186) for atorvastatin in Pennsylvania.

CONCLUSIONS: Across 4 state government operated websites which publicly report retail prices for 6 commonly prescribed medications for chronic conditions, price information is often deficient. Yet, when retail prices are actually reported, the monthly savings for patients could be substantial, particularly for certain medications. Given these potential savings and the growing number of Americans who are facing high out-of-pocket expenditures for health care, policymakers and clinicians should work to ensure that retail prices for commonly used prescription drugs are more consistently available as well as develop new strategies to optimize patients' use of this information.

POTENTIAL HEALTH-CARE SERVICE UTILIZATION SUBSTITUTION EFFECTS INDUCED BY CASE MANAGEMENT FOR EMERGENCY DEPARTMENT FREQUENT USERS Karine Moschetti^{2, 8}; Katia Iglesias⁶; Stéphanie Baggio³; Venetia - Sofia Velonaki¹⁰; Omella Ruggeri⁵; Olivier Hugli⁴; Bernard Burnand⁸; Jean-Bernard Daepfen⁹; Jean-Blaise Wasserfallen¹; Patrick Bodenmann⁷. ¹CHUV, Lausanne, Switzerland; ²Health Assessment Unit, Lausanne, Switzerland; ³Lausanne University, Lausanne, Switzerland; ⁴Lausanne university hospital, Lausanne, Switzerland; ⁵University Hospital of Lausanne (CHUV), Lausanne, Switzerland; ⁶University of Neuchâtel, Neuchâtel, Switzerland; ⁷Vulnerable Population Center, Lausanne, Switzerland; ⁸Institute of Social and Preventive Medicine, Lausanne, Switzerland; ⁹Alcohol Treatment Centre, Lausanne, Switzerland; ¹⁰PhD, Department of Community Medicine and Public Health, Lausanne, Switzerland. (Tracking ID #2199681)

BACKGROUND: In most of the emergency departments (ED) in developed countries, a subset of patients visits the ED frequently. Despite their small numbers, these patients are the source of a disproportionally high number of all ED visits, and use a significant proportion of healthcare resources. They place a heavy economic burden on hospital and healthcare systems budgets overall. Several interventions have been carried out to improve the management of these ED frequent users. Case management has been shown in some North American studies to reduce ED utilization and costs. In these studies, cost analyses have been carried out from the hospital perspective without examining the costs induced by healthcare consumed in the community. However, case management might reduce ED

visits and costs from the hospital's perspective, but induce substitution effects, and increase health service utilization outside the hospital. This study examined if an interdisciplinary case-management intervention—compared to standard ED care—reduced costs generated by frequent ED users not only from the hospital perspective, but also from the healthcare system perspective—that is, from a broader perspective taking into account the costs of healthcare services used outside the hospital.

METHODS: In this randomized controlled trial, 250 adult frequent emergency department users (5 or more visits during the previous 12 months) who visited the ED of the University Hospital of Lausanne, Switzerland, between May 2012 and July 2013 were allocated to one of two groups: case management intervention (CM) or standard ED care (SC), and followed up for 12 months. Depending on the perspective of the analysis, costs were evaluated differently. For the analysis from the hospital's perspective, the true value of resources used to provide services was used as a cost estimate. These data were obtained from the hospital's analytical accounting system. For the analysis from the health-care system perspective, all health-care services consumed by users and charged were used as an estimate of costs. These data were obtained from health insurance providers for a subsample of participants. To allow comparisons in a same time period, individual monthly average costs were calculated. Multivariate linear models including a fixed effect "group" were run using socio-demographic characteristics and health-related variables as controlling variables (age, gender, educational level, citizenship, marital status, somatic and mental health problems, and risk behaviors).

RESULTS: At the end of the 12-month follow-up, 115 patients were in CM and 115 in SC (20 had died). The mean age of patients was 44.4 (± 17.9); 46 % were Swiss; 57 % were male, and 80 % were French-speaking; 25 % had a low educational level (compulsory education); 69 and 51 % suffered from somatic or mental health problems, respectively; and 33 % presented risk behaviors. Multivariate models showed that a higher age, Swiss citizenship, and having somatic health problems increased costs significantly. In the multivariate models of the cost analysis, the regression coefficient associated with the CM group compared to SC group was negative (meaning lower costs) from the hospital system perspective, but positive in the analysis from the healthcare system perspective (meaning higher costs). However, these two coefficients were not statistically significant.

CONCLUSIONS: The role of the CM team is to guide patients through the care process and provide social support. Patient-centered care is part of a continuous integration of medical and social dimensions and, as such, the place of intervention is not limited to the hospital but often extends into the community. The results of the CM intervention implemented at the University Hospital of Lausanne, Switzerland, had previously showed a significant reduction in the number of emergency department visits. The reduced costs from the hospital perspective of the CM group were likely a result of the success of CM in reducing the number of ED visits. On the other hand, the evaluation of costs from the health-care system perspective suggests that the CM intervention has also impacted the utilization of healthcare services by reorienting patients to medical and social services provided in the community. Further investigations into a larger sample, to increase the power of the analysis, and over a longer study period are required to validate to what extent the decrease in the number of emergency visits induced by case-management interventions translates into a reduction of the economic burden that ED frequent users place on hospital budgets, but also on health-care systems overall.

PRACTICAL LESSONS FROM A LONGITUDINAL PRAGMATIC TRIAL OF PERSONALIZED DECISION SUPPORT FOR OLDER ADULTS Jennifer Cooper¹; Elbert S. Huang³; Aviva G. Nathan². ¹The University of Chicago, Chicago, IL; ²University of Chicago, Chicago, IL; ³University of Chicago, Chicago, IL. (Tracking ID #2198727)

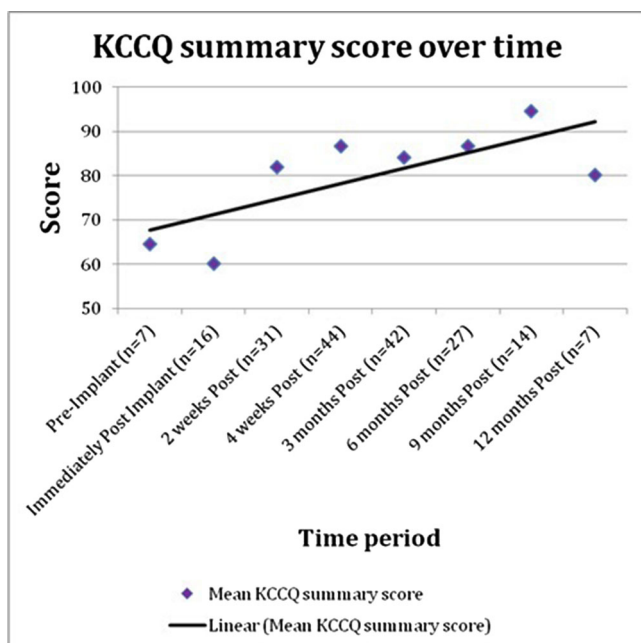
BACKGROUND: Geriatric care guidelines for type 2 diabetes encourage individualization of glycemic targets (A1C goals) based on life expectancy (LE) and patient preferences. It is unclear how to operationalize these guidelines over time in clinical practice. We longitudinally pilot-tested a web-based decision support tool that provides individualized prognostic information to patients and physicians and elicits patient preferences.

METHODS: Physicians and their patients were randomized to the decision support tool, with 3:1 recruitment starting in the summer of 2012. Patients were ≥ 65 years, had A1C ≥ 6.5 %, and no dementia. Prior to a physician encounter, intervention patients interacted with the tool and generated a printout for their physician that included individual patient's LE estimates, geriatric screening results and treatment preferences. Control patients received an A1C pamphlet. Physicians and patients were surveyed before and after the encounter. Both patient arms were asked to return for longitudinal follow-up. The main outcomes of interest were 1.) feasibility surrounding patient retention and interaction with the decision support tool in a real-world clinical setting and 2.) patient knowledge of A1C goals over time.

RESULTS: Sixty-seven (53 intervention, 14 control) of the original 100 patients enrolled returned for a second encounter with the research staff. Patients did not return due to disinterest in longitudinal participation ($N=10$), death ($N=7$), their primary care physician

leaving the hospital network ($N=7$), loss to follow-up ($N=4$), serious health reasons ($N=3$), increased cognitive impairment ($N=1$) and financial reasons ($N=1$). The average time between patient visits was 546 days (322–896 days). Sixty-two percent of intervention patients reported that they went over the printout with their physician during their clinic visit and approximately half of these patients stated their physician went over the entire printout. Almost half of the intervention patients said they would like to interact with the decision support tool at every doctor's appointment and 61 % said that they would like to be able to access the decision support tool at home via the web. In both patient arms, A1C knowledge fluctuated over the study time period (Figure 1), with the highest percentage of patients stating they knew their A1C goal after a clinical encounter (71 % intervention and control post visit 1, 69 % intervention and 71 % control post visit 2). The percentage of patients who knew their A1C decreased (16 % in intervention patients, 29 % in control patients) from the time between the end of visit 1 and start of visit 2.

CONCLUSIONS: A personalized decision support tool continues to be a promising option for increasing individualization of glycemic goals among older adults with diabetes. A more prescriptive approach to future randomized controlled trials surrounding decision support in older adults may improve patient follow-up and patient knowledge of individual A1C goals.



PREDICTING ALL-CAUSE 30-DAY HOSPITAL READMISSIONS USING ELECTRONIC HEALTH RECORD DATA OVER THE COURSE OF HOSPITALIZATION: MODEL DERIVATION, VALIDATION AND COMPARISON Oanh K. Nguyen^{1, 1}; Anil N. Makam^{1, 1}; Christopher Clark²; Song Zhang¹; Bin Xie²; Ruben Amarasingham^{2, 1}; Ethan Halm^{1, 1}. ¹UT Southwestern Medical Center, Dallas, TX; ²Parkland Center for Clinical Innovation, Dallas, TX. (Tracking ID #2195966)

BACKGROUND: Predicting those at highest risk readmission can help target resource-intensive interventions to those most likely to benefit. However, current models have only modest discriminatory power. This study sought to: 1) derive and validate a risk prediction model incorporating EHR data from the 'full' hospital stay, including data on hospital complications and clinical trajectory, and 2) compare 'full-stay' model performance to other risk prediction models.

METHODS: This was an observational study using EHR data from 6 hospitals in the Dallas-Fort Worth metroplex, including safety net, community, teaching, and non-teaching sites. We included hospital discharges from all internal medicine inpatient services among adults (≥ 18 years) between Nov. 1, 2009 and Oct. 30, 2010. We excluded inpatient deaths, transfers to an acute care facility, or those who left against medical advice. For patients with multiple hospitalizations, we included only the first one. Patients were randomly split into derivation and validation cohorts. The primary outcome was a non-elective readmission within 30 days to any of 75 acute care hospitals in north Texas ascertained using an all-payer regional hospitalization database. For comparison, we used

our group's separately derived and validated readmission model using EHR data from the first hospital day and two previously validated full-stay models based on claims data: the LACE and HOSPITAL models.

RESULTS: Among 32,922 admissions (derivation=16,492; validation=16,430), 12.7 % had a 30-day readmission. In addition to predictors from the first day of hospitalization, we identified hospital complications such as C. difficile infection (AOR 2.01, 95 % CI 1.17–3.45); clinical instability on discharge (AOR 1.25 per instability, 95 % CI 1.15–1.36); lab abnormalities on discharge, such as hyponatremia ($\text{Na} < 135 \text{ mEq/L}$; AOR 1.35, 95 % CI 1.20–1.53); and length of stay (AOR 1.06 per hospital day, 95 % CI 1.04–1.07) as significant additional predictors. The full-stay model had statistically better discrimination than other models though the improvement was modest (Table). Though the full-stay model was also able to predict a broader range of probabilities for readmission risk (Table), it was only slightly better in identifying the highest risk quintile compared to other models (LR+ 2.38 vs 1.84–2.18 for other models).

CONCLUSIONS: Incorporating clinically granular EHR data from the full hospital stay modestly improves prediction of 30-day readmissions. Despite drawing on data from diverse settings and being able to adjust for sociodemographic factors and many in-hospital clinical severity, comorbidity, and trajectory factors, our findings suggest that many factors driving hospital readmission remain unmeasured and unaccounted for.

Model Discrimination and Comparison to Existing Models for 30-Day Hospital Readmission

Model Name	C-statistic (95 % CI)	IDI (95 % CI)	NRI (95 % CI)	Predicted Risk, %	Lowest Decile	Highest Decile
Full-stay model						
Derivation cohort	0.72 (0.70–0.73)	–	–	4.1	36.5	
Validation cohort	0.69 (0.68–0.70)	[Reference]	[Reference]	4.1	36.5	
First-day model	0.67 (0.66–0.68)	–0.012 (–0.014 to –0.010)	–0.054 (–0.085 to –0.024)	5.8	31.9	
LACE model	0.65 (0.64–0.66)	–0.026 (–0.029 to –0.023)	–0.122 (–0.156 to –0.087)	6.1	27.5	
HOSPITAL model	0.64 (0.62–0.65)	–0.032 (–0.035 to –0.029)	–0.225 (–0.260 to –0.189)	6.7	26.6	

CI=confidence interval; IDI=Integrated Discrimination Improvement; NRI=Net Reclassification Index

PREDICTING LENGTH OF STAY (LOS) AMONG HEART FAILURE (HF) ADMISSIONS: CAN SIMPLE SEVERITY OF ILLNESS (SOI) SCORES BE USED TO PREDICT LOS IN COMPLEX PATIENT POPULATIONS? Madeline R. Sterling; Ashley Beecy; Parag Goyal; Caroline Andrew; Andrew Warner; Carla Boutin-Foster; Erica Jones. New York Presbyterian—Weill Cornell, New York, NY. (Tracking ID #2194947)

BACKGROUND: Heart Failure (HF) accounts for 1 million hospitalizations each year in the United States. Factors associated with hospitalization Length of Stay (LOS) among heart failure patients remain variable by institution. Many algorithms to predict LOS require numerous clinical variables and physiologic data. Less is known about the ability of a severity of illness (SOI) score, which is 4 part score applied to patient charts on admission by hospital administrators, to predict LOS in complex patient populations. Here we sought to first identify demographic and clinical characteristics of heart failure patients associated with LOS. Using these factors, our objective was to determine if SOI had the ability to predict LOS at our institution.

METHODS: This is a retrospective cohort study of adult patients with CHF admitted to the cardiology step-down-unit (SDU) of a large, urban, academic medical center for a six month period for HF related diagnoses. Data was collected using an electronic database. Length of Stay (LOS) (days) in the hospital during admission was the primary outcome. LOS was categorized as 0–10, 11–20, 21–30 and 31–40 days. Descriptive statistics of the study population's demographic (4) clinical (11) and hospital-based characteristics (2) were performed. These covariates were identified using a priori knowledge and validated criteria. Chi squared and Fisher exact tests were used for bivariate analysis of each variable with LOS. A series of multivariable linear regression models were built to estimate

associations between clinical characteristics and LOS. Transformations of the dependent variable were performed such that the assumptions of MLR were met in the final model.

RESULTS: During a period of 6 months, 346 patients were admitted for HF. Of them, 61 % were men, 35 % white, 10 % black, 22 % non-white Hispanic and 32 % Asian, Indian or other. The majority of the population were older than 65 years (70 %) and 44 % of the population lived alone. Most patients had two or more comorbid conditions, most commonly coronary artery disease, atrial fibrillation and left ventricular dysfunction. Severity of Illness (SOI) scores ranged from 1 to 4, with 4 being most severe. The majority of the population had scores of 2 (30.6 %) and 3 (44.5 %). Of the 346 admissions, 297 admissions (85.8 %) had LOS of 0–11 days; 11 % had LOS of 11–20 days, 2–3 % had LOS greater than 21 days. The mean LOS was 5.88 days (SD). Independent predictors of increased LOS were SOI ($p<.001$), Aortic Stenosis ($p=0.05$) and CVA ($p=0.04$). In adjusted models, patients with Atrial fibrillation, Diabetes, COPD and CVA were associated with higher LOS (7 days) compared to patients who didn't have any of the aforementioned diseases. Also, those with Prior Stents and Dementia had a higher mean LOS (6 days) compared with those who had neither of these diseases. Co-morbidity scores and LOS had a positive linear relationship until a point; we found that having 5 or more co-morbidities was associated with decreased LOS. The final log transformed model met all OLS assumptions and found SOI to have significant predictive bearing on LOS such that a 1 point increase in SOI would yield a 0.72 % change in LOS ($b=0.7187$ $P<0.0001$).

CONCLUSIONS: The severity of illness score (SOI), which is based on 4 variables and assigned to patients by hospital administrators upon admission, has significant predictive ability at our institution. To date, it has been underutilized and represents a cost-effective, simple and time-sensitive way for health care providers and administrators to predict LOS in complex patient populations admitted with heart failure.

PREDICTING READMISSION RISK FOLLOWING CORONARY REVASCULARIZATION AT THE TIME OF ADMISSION Daniel J. Elliott; Paul Kolm; Zaher Fanari; carla russo; William S. Weintraub. Christiana Care Health System, Newark, DE. (Tracking ID #2198936)

BACKGROUND: Reducing readmissions following hospitalization for coronary revascularization is a national priority. Identifying patients at high risk for readmission early in a hospitalization would enable hospitals to target these individuals for enhanced discharge planning. Traditional risk models identify patients based on characteristics that may not be available until after discharge. We sought to compare the model performance for models based on data that is available at the time of hospitalization.

METHODS: We developed models to predict 30-day inpatient readmission to our institution for a cohort of patients who were received Percutaneous Coronary Revascularization (PCI) at our institution between January 2010 and November 2014. We developed three models using data available at three different time points in the hospitalization: 1) at admission, 2) at discharge and 3) discharge plus registry data from the American College of Cardiology CathPCI registry. Candidate variables for the admission model included demographics, comorbidities, and previous utilization within our system. The discharge model added new comorbidities, length of stay, and discharge disposition. The third model included clinical data such as angina classification, TIMI flow, number of revascularized vessels, and discharge medications. We assessed each model using the c-index.

RESULTS: Our cohort included 5949 PCI patients. The overall readmission rate was 7.2 % in the PCI group. The admission model had a c-statistic of 0.734. The addition of discharge variables did not statistically improve the model (c-statistic=0.734). The addition of registry variables slightly improved the model (c-statistic=0.745). The improvement was statistically significant ($p=0.011$). The factors most strongly associated with readmission in the admission model were age (OR 1.23 per decade, $p<0.001$), previous hospitalization within 6 months (OR 1.27, $p<0.001$), a previous diagnosis of CHF (OR 1.97, $p<0.001$), and elective status (OR=0.36, $p<0.001$). The associations persisted through all the models except for the association of CHF, which was attenuated by the addition of LOS and registry variables.

CONCLUSIONS: Risk prediction models using data available from clinical registries and discharge data minimally improved the performance of models based solely on demographic and utilization data available at the time of admission. These simplified models may be sufficient to identify patients at highest risk of readmission following coronary revascularization early in the hospitalization. This would allow providers and health systems to target high-risk patients with enhanced discharge planning during the course of the hospitalization, and this may improve the ability to avoid readmissions.

PREDICTING RECURRENCE IN ELDERLY PATIENTS WITH UNPROVOKED VENOUS THROMBOEMBOLISM: PROSPECTIVE VALIDATION OF THE UPDATED VIENNA PREDICTION MODEL Tobias Tritschler¹; Marie Méan^{1, 2}; Andreas Limacher³; Nicolas Rodondi¹; Drahomir Aujesky¹. ¹Bern University Hospital, Bern, Switzerland; ²University Hospital of Lausanne, Lausanne, Switzerland; ³University of Bern, Bern, Switzerland. (Tracking ID #2193984)

BACKGROUND: The updated Vienna Prediction Model has been developed to risk-stratify patients with unprovoked venous thromboembolism (VTE) according to their recurrence risk based on their sex, VTE location and D-dimer. We prospectively evaluated the accuracy of the updated Vienna Prediction Model in identifying elderly patients with unprovoked VTE who are at low risk of VTE recurrence.

METHODS: We followed-up 156 in- and outpatients aged ≥ 65 years with symptomatic, unprovoked VTE from 9 Swiss university and non-university hospitals (09/09-12/13), starting 12 months after the index VTE. All patients had previously completed a 3 to 12-month course of anticoagulation. Unprovoked VTE was defined as the occurrence of deep vein thrombosis or pulmonary embolism in the absence of risk factors, such as active cancer, immobilization, major surgery, or estrogen therapy. All patients underwent quantitative D-dimer testing (ELISA, VIDAS®, bioMérieux, France). The outcome was the recurrence of symptomatic, objectively confirmed VTE within 12 and 24 months, adjudicated by a committee of three blinded clinical experts. We determined the proportion of patients classified as low risk (lowest quartile of predicted 12-month risk of VTE recurrence) according to the updated Vienna Prediction Model and compared the proportion of VTE recurrence at 12 and 24 months between low- and higher-risk patients. We also assessed the discriminative power of the predicted 12-month risk of VTE recurrence by calculating the area under the receiver operating characteristic (ROC) curve for VTE recurrence at 12 and 24 months.

RESULTS: The median age was 74 years and 41 % of patients were women. The proportion of VTE recurrence was 11 % after 12 months and 17 % after 24 months. Patients with a predicted 12-month risk below 6.2 % were classified as low-risk based on the updated Vienna Prediction Model. The proportion of recurrent VTE at 12 months (13 vs. 10%; $P=0.767$) and 24 months (15 % vs. 17%; $P=1.0$) did not differ between low vs. higher-risk patients. The area under the ROC curve for predicting VTE recurrence at 12 and 24 months was 0.39 (95 % CI 0.25 to 0.52) and 0.43 (95 % CI 0.31 to 0.54), respectively.

CONCLUSIONS: In our prospective multicenter study of elderly patients with unprovoked VTE, the updated Vienna Prediction Model did not discriminate between patients who developed recurrent VTE from those who did not. The updated Vienna Prediction Model may not be suitable for identifying elderly low-risk patients with unprovoked VTE who do not benefit from extended anticoagulation.

PREDICTORS OF ADHERENCE TO TELEPHONE COUNSELING FOR SMOKING CESSATION AMONGST VETERANS PRESENTING TO VA MENTAL HEALTH CLINICS Matthew R. Augustine²; Helene Strauss²; David M. Levine²; Priyanka Chugh²; Binhuan Wang²; Ellie Grossman^{2, 1}; Erin Rogers^{3, 1}; Scott Sherman^{3, 2}. ¹New York University, New York, NY; ²New York University Medical Center, New York, NY; ³VA NY Harbor Healthcare System, New York, NY. (Tracking ID #2199147)

BACKGROUND: Smoking is a leading cause of preventable morbidity and mortality and disproportionately affects Veterans and those with mental health conditions. Proactive telephone quitline counseling is effective compared to no counseling, self-help, and pharmacotherapy. Despite its wide use, little is known about optimal implementation. Few studies have analyzed the baseline factors predictive of adherence to the quitline treatment process. This secondary analysis of a regional telephone smoking cessation program evaluates factors that predict adherence to telephone counseling and the relationship between adherence and smoking cessation.

METHODS: TeleQuitMH was a 6 month multi-centered, randomized trial of a proactive telephone counseling program among veterans with mental health conditions. From a baseline patient questionnaire, we selected nineteen potential predictors to explore, including demographics, motivation, stage of change, and environment/support. Bivariate analysis was used to build a multivariate model to determine factors associated with adherence to counseling sessions. A bivariate analysis then explored the association between adherence to counseling sessions and smoking cessation at 6 months.

RESULTS: One thousand two hundred six patients were referred to TeleQuitMH for telephone counseling, of which 577 were enrolled and 270 were randomized to receive VA-based telephone counseling. In bivariate and multivariable models, increased age ($p<0.05$) and motivation to quit ($p<0.05$) were associated with adherence to more counseling sessions. Participants who reported 30-day abstinence at 6 months completed more counseling sessions (6.88, SD 3.36 vs. 2.97, SD 2.90; OR 1.43, CI 1.29–1.60).

CONCLUSIONS: In a proactive quitline counseling program for Veterans in care of mental health providers, increased age and motivation are associated with increased adherence to telephone counseling. As adherence to the treatment regimen was strongly associated with smoking cessation, research targeted at enhancing adherence offers a potential way to increase rates of cessation.

PREDICTORS OF QUALITY OF LIFE AMONG AFRICAN AMERICANS WITH PERIPHERAL ARTERY DISEASE Tracie C. Collins¹; Jasjit Ahluwalia⁴; Nikki Nollen⁵; Nicole Rogers³; Rosalee Zackula². ¹KU School of Medicine—Wichita, Wichita, MN; ²University of Kansas School of Medicine-Wichita, Wichita, KS; ³Wichita State University, Wichita, KS; ⁴University of Minnesota, Minneapolis, MN; ⁵Kansas University Medical Center, Kansas City, KS. (Tracking ID #2199233)

Research reported in this publication was supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number R01HL098909. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

BACKGROUND: African Americans are at increased risk for peripheral artery disease (PAD)—atherosclerosis of the abdominal aorta and arteries of the lower extremities. PAD is a major risk factor for poor quality of life but the risk factors associated with this outcome are not well known. We sought to determine the risk factors associated with quality of life among a cohort of African Americans with PAD.

METHODS: We analyzed baseline data from an ongoing NIH funded clinical trial in which we seek to determine the efficacy of a behavioral intervention to improve walking distance among African Americans with PAD. To be eligible for the trial, participants self-identify as African American and screen positive for PAD [ankle-brachial index (ABI) \leq 0.99]. Participants are excluded if they have undergone leg revascularization within the preceding 3 months, contraindications to exercise, or a treadmill test positive for coronary ischemia. Participants complete three visits which include baseline, 6-, and 12 months. We collect laboratory data (lipid profile and glycosylated hemoglobin) and vital signs. We also administer validated surveys to ascertain medical history (Lifestyle and Clinical Survey), quality of life (Medical Outcomes Study Standard Form-12), leg symptom subtypes (San Diego Claudication Questionnaire), exercise self-efficacy (Exercise Self-Efficacy Scale), walking impairment (Walking Impairment Questionnaire), perceptions of unfair treatment because of race, and race centrality (i.e., determining whether race is a core component of how one defines him/herself). For this analysis, we used generalized linear regression modeling with the dependent variables of the MOS SF-12 Physical Summary Scale (PSS) and MOS SF-12 Mental Summary Scale (MSS) scores. Independent variables considered for each model included ABI (<0.9 versus 0.9 or higher), leg symptom subtypes of intermittent claudication or atypical leg symptoms versus asymptomatic disease, exercise self-efficacy, walking impairment (distance, speed, stair climbing scores of 0 to 100 %), medical history, race centrality (scale of 1 to 10) and unfair treatment (scale of 1 to 10).

RESULTS: Among 107 African Americans enrolled, 75 % women, the mean age of the cohort is 64 years (SD 12). Within the cohort, 92 (86 %) have hypertension, 38 (36 %) have diabetes mellitus, 26 (24 %) are current smokers, 59 (55 %) have hyperlipidemia, 58 (54 %) are past smokers, and 41 (38 %) have osteoarthritis. Risk factors positively associated with the PSS score included the ABI [β coefficient 5.004 ($P=.005$)], and distance subscale score [β coefficient .111 ($P<.001$)]. Factors negatively associated with PSS scores included exercise self-efficacy [β coefficient -3.765 ($P=.045$)] and race centrality [β coefficient $-.588$ ($P=.050$)]. The risk factor positively associated with the MSS score was osteoarthritis [β coefficient 4.729 ($P=.014$)] and the risk factor negatively associated with the MSS score was the perception of unfair treatment because of race [β coefficient -1.293 ($P=.021$)].

CONCLUSIONS: Predictors of quality of life among African Americans with PAD included disease severity, walking ability, exercise self-efficacy, osteoarthritis, importance of race for self-identity, unfair treatment because of race. Early diagnosis of PAD, walking ability, self-efficacy for exercise, osteoarthritis, and unfair treatment because of race may be targets to improve quality of life among African Americans with PAD.

PRELIMINARY FINDINGS FOR A MULTIFACETED INTERVENTION DESIGNED TO REDUCE TREATMENT DISPARITIES IN EARLY STAGE, NON-SMALL CELL LUNG CANCER Samuel Cykert¹; Paul Walker²; Peggie Dilworth-Anderson³; Maria Cirino-Marciano⁴; Lloyd Edwards³. ¹University of North Carolina, Chapel Hill, NC; ²Brody School of Medicine, Greenville, NC; ³University of North Carolina-Chapel Hill, Chapel Hill, NC; ⁴University of South Carolina School of Medicine, Columbia, SC. (Tracking ID #2199260)

BACKGROUND: African-Americans (AA) with lung cancer experience a higher annual death rate compared to Whites (W) with AA men particularly affected (78.5 vs 65.7 deaths per 100,000 population). Despite this risk, Bach and others have shown that over the last 3

decades surgical rates for AA patients with potentially curable stage 1 and 2, non-small cell cancer lag behind surgical rates for W patients. The treatment difference is more remarkable given that Gray et al. demonstrated that areas of the U.S. with high surgical rates (>79 %) have less lung cancer mortality than areas with lower surgical rates even considering high risk patients. In this report, we describe early results from a multifaceted intervention trial designed to optimize lung surgery rates for all patients and reduce disparities associated with AA race.

METHODS: We first performed a 3-year retrospective chart review for all patients with biopsy proven lung cancer at 3 academic institutions to establish baseline surgical rates according to demographic features, including race, and severity of illness. We then applied an intervention that applied electronic systems, quality improvement techniques and an enhanced care team at each study site. The specific intervention components are: (1) a real time electronic registry that provides a warning if either a patient misses an appointment or doesn't reach a designated milestone in care, (2) quarterly feedback of surgical rates by race and co-morbid illness to providers and other cancer care personnel, and (3) a specially trained navigator to enhance communication with affected patients and between those patients and the care team. Given that electronic health records are now ubiquitous, (1) and (2) were used for all patients and compared to retrospective controls. Consented patients were randomly assigned (3). Patients were identified at initial visit either through biopsy proven disease or a Bayesian probability algorithm. Those who were later shown to have benign or advanced disease were withdrawn.

RESULTS: Baseline surgical rates from the retrospective analysis of 714 early stage, non-small cell patients were 69 % for W and 66 % for AA patients. When controlling comorbidities, COPD, age, and other demographic data, the Odds Ratio for surgery for AA compared to W lung cancer patients was 0.64 (95 % CI 0.43, 0.96). To date 157 patients have been recruited prospectively including 54 AA (34 %). The mean age to date for the study group is 65 years; 53 % are female. Forty-nine percent were assigned to special navigation. Preliminary findings show an overall surgical rate of 81 % (82 % W, 78%AA, $p=0.5$). In multivariate analysis, using demographic variables, comorbid illness, pulmonary function, and patient perceptions of communication as independent variables, age >70 (OR 0.18, 95 % CI 0.38, 0.83) and a forced expiratory volume <40 % of predicted (OR 0.04, 95 % CI .001, 0.19) were associated with lower surgical rates. Notably, AA race and medical comorbidity scores did not affect rates.

CONCLUSIONS: Early results from a multifaceted intervention designed to optimize lung cancer surgery and narrow the surgical gap between AA and W patients appear promising.

PREPARING GENERAL INTERNAL MEDICINE (GIM) RESIDENTS FOR THE REAL WORLD—CAN WE PREDICT GIM HUMAN RESOURCE NEEDS IN A CHANGING HEALTH LANDSCAPE? Sharon E. Card; Heather A. Ward; Lindsey Anderson. University of Saskatchewan, Saskatoon, SK, Canada. (Tracking ID #2194161)

BACKGROUND: A key feature of the discipline of GIM worldwide is the ability of General Internists to adapt their practice to context. This adaptability to context strengthens GIM's value to the health care workforce. We hypothesize it also constrains GIM health care workforce planning due to variation in physician practice patterns both within and between health regions. Residency programs are charged with the task of "career planning" for graduates but this is difficult when human resource needs are rapidly changing and differ geographically. This study aimed to identify the range of scope of practice of GIM both current and anticipated throughout the province of Saskatchewan, Canada. The objective was to determine if it was possible to identify specific future GIM employment opportunities and to link these needs to educational programming within the GIM Residency program.

METHODS: Saskatchewan is a province of approximately 1.1 million in the center of Canada. There are 12 distinct health regions. A practicing General Internist, recruitment personnel and administrative personnel were contacted in each health region for an interview. Quantitative and qualitative data were gathered either in person or via telephone using a standardized template. The interview identified both current and anticipated GIM human resource needs as well as the scope of practice or skills needed within each region. The goal was to obtain three interviews per health region with a minimum of one. Quantitative data is presented as ranges and medians. Qualitative data was analyzed for themes.

RESULTS: Although regions anticipated need for an incremental number of General Internists over the next 10 years, there was a consistent difficulty in establishing an exact number needed in any time frame due to uncertainties in physician recruitment and retention as well as changing health region needs. There was a consistent reactive versus proactive approach to recruitment. For example, regions would be unable to anticipate if current MDs would stay in a community, resulting in attempts to fill vacancies after a physician left. Interviews confirmed that the current scope of practice of GIM is widely variable across the province and at different practice location types. It also changes over

the course of a physician's career. Competency in cardiac, gastrointestinal, respiratory and cerebrovascular diseases were felt to be consistently important due to the prevalence of these disorders in the province. Particularly outside the large urban cities critical care skills were identified as being vital. Each region had particular and differing future skill needs (example Echocardiography or Colonoscopy skills, generally only needed in one graduate over several years). Respondents emphasized that General Internists must possess the full generalist scope of practice instead of subspecializing, with the ability to adjust scope to meet the health needs of their patients. All regions identified a need for expansion of the role of GIM in the ambulatory care setting. Expanded training in procedural skills; electro diagnostics; Point of Care ultrasound; healthcare administration and leadership; practice management were perceived as needs for all graduates to allow them to practice to the full scope of their potential. Respondents had difficulty establishing suggestions for improving the links between the educational system and eventual practice needs. Suggestions included enhancing distributed learning; expanding the skill set of GIM graduates to facilitate practice in rural locations; as well as enhancing tele health between distributed sites and the urban areas to allow more frequent communication—for example at journal clubs.

CONCLUSIONS: Linking GIM training to human resource planning is critical to ensure a stable workforce. Understanding the scope of practice of General Internists in Saskatchewan's changing health care system will allow the GIM residency program to adapt and train physicians for future needs. A recurrent theme of the skills and attitudes that GIM brings to the health care environment worldwide is that of a combination of a broad scope of practice but at the same time an adaptable set of skills that is unique for each practitioner for their own community. To fully understand health human resource planning for GIM an understanding of the range of scope of practice in each community that a residency program "serves" is needed. With the rapidly changing human resource needs we suggest that each residency program needs to link with the community for whom it is creating practitioners to understand needs and plan for them with individual graduates. As the Competence by Design project commences at the Royal College of Physicians and Surgeons of Canada this will be an ideal time to truly link education to future practice.

PREVALENCE AND CORRELATES OF ACTIONS TAKEN BY WOMEN IN RESPONSE TO RECENT INTIMATE PARTNER VIOLENCE (IPV) Jennifer McCall-Hosenfeld; Carol S. Weisman; Erik B. Lehman. Penn State College of Medicine, Hershey, PA. (Tracking ID #2169911)

BACKGROUND: Intimate Partner Violence (IPV)—physical violence, sexual violence, stalking, and psychological aggression perpetrated by a current or former partner—is a prevalent public health threat for women. Nearly half of all U.S. women have experienced psychological aggression and almost a quarter of all women have experienced severe physical violence perpetrated by a partner in their lifetimes. Recent scholarship regarding IPV has focused on specific actions taken by women in response to IPV, but little is known about the correlates of these actions. We investigate specific actions taken in response to IPV by exposed women, and examine the psychosocial and health-related correlates of these actions.

METHODS: A sample of women ages 18–64 was selected from primary care practices and domestic violence agencies serving Central Pennsylvania. Women who reported recent (past-year) IPV exposure using the HARK (humiliation-afraid-rape-kick) screener were asked about specific actions taken in response to this exposure to IPV, using the Intimate Partner Violence Strategies Index (Goodman, 2003) supplemented with open-ended questions based on our prior work. Multi-item scales were created for each action type. We developed a conceptual model identifying psychosocial and health-related factors as determinants of action taking. Possible determinants included type of violence exposure (physical vs. nonphysical IPV), adverse childhood experiences with violence or household dysfunction (ACEs), social support, any mental health disorder (depression, anxiety, bipolar or post-traumatic stress disorder), and sociodemographics (having children at home, marital/partner status, poverty, education, rurality.) Multiple logistic regression identified factors associated with each action type.

RESULTS: Among 109 women reporting recent IPV, 23 % reported physical IPV (rape/kick), 58 % reported high exposure to ACEs, and 49 % reported any adverse mental health condition. We identified four multi-item scales reflecting women's prevalent actions in response to IPV, all with good to excellent internal consistency. Scales were categorized as: *placating* (scale $\alpha=0.78$, examples: "tried to avoid an argument with my partner," 64 %; "tried not to cry," 48 %), *help-seeking* (scale $\alpha=0.68$, examples: "reached out to my friends or family," 62 %; "talked to a doctor or nurse," 24 %), *resistance* (scale $\alpha=0.80$, example: "fought back verbally," 61 %; "refused to do what my partner wanted" 47 %), *safety planning* (scale $\alpha=0.90$, examples: "kept money/[valuables hidden]," 31 %; "worked out an escape plan," 16 %), and past-year *alcohol/drug use*, (single item, 33 %). In multivariable analyses, physical IPV (versus nonphysical) was independently associated with alcohol/drugs, (aOR=3.07, (1.02, 9.22)), resistance (aOR=5.73 (1.59, 20.72)), and placating (aOR=4.00, (1.20, 13.37)) strategies. Having a mental health

diagnosis was associated with both safety planning (aOR=3.54, (1.28, 9.79)), and help-seeking (aOR=2.99 (1.09, 8.21)) strategies. At or near poverty (versus not poverty) was significantly associated with help-seeking (aOR=3.32, (1.06, 10.38)). We found no independent effects of rural residence, having children at home, or social support on types of actions taken.

CONCLUSIONS: This study identified key types of actions in response to past-year IPV exposure; these actions included both potentially helpful and harmful behaviors. Physical IPV exposure discriminated between women who did and did not use specific actions in response to IPV (alcohol/drugs, resistance and placating strategies). Because much physical violence arises from nonphysical abuse, identification of non-physical violence before it escalates may help healthcare providers to support women in pursuing helpful actions, and reducing harmful actions. Moreover, the associations we found between both safety planning and help-seeking behaviors and having a mental health diagnosis may reflect reverse causality in these cross-sectional data, i.e., women who have a mental health diagnosis may be engaged in care (thus seeking help) and within those care systems may learn about safety-planning. These findings reinforce the importance of primary healthcare systems (where half of all mental health is treated) in assisting IPV-exposed women with safety planning.

PREVALENCE AND EFFECTS OF LAPSES IN PUBLIC INSURANCE COVERAGE AMONG SAFETY NET PATIENTS FOLLOWING MASSACHUSETTS HEALTH CARE REFORM Carolyn Koulouris; Rebecca Rogers; Dylan Bothamley; Jennifer Huang; Neil N. Shah; Paula Lueras; Amy Pastemack; Christina Phillips; Judy Y. Kwok; Gaurab Basu; Danny McCormick. Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2198194)

BACKGROUND: Lapses in public health insurance programs such as Medicaid are common. They are often caused by involuntary disenrollment when required paperwork such as re-applications or income verification data is not periodically received by the program (due to enrollee's failure to submit this information or to receive notification that it is due, e.g.). Furthermore, such lapses are associated with substantial barriers to accessing affordable care. The Massachusetts health care reform of 2006, the template for national reform, sought to increase access through a major expansion of Medicaid (and redesign of its eligibility determination process), creation of subsidized insurance plans available through a health insurance exchange and a tax penalty enforced mandate to maintain coverage. No prior studies, however, have examined the frequency or potential consequences of lapses experienced by those in public insurance programs created by the Massachusetts reform.

METHODS: We conducted face-to-face structured interviews with 644 publicly insured (Medicaid and Commonwealth Care plans) and 310 privately insured patients presenting to three emergency departments at a large integrated safety net health care system in the greater Boston area. We confirmed insurance type using a statewide database that is updated daily. We included patients aged 18–64, who spoke English, Portuguese, Spanish, or Haitian Creole. We excluded severely ill patients. The survey collected data on patients' demographic characteristics, experiences with current insurance plan, including lapses, and potential economic and medical consequences of lapses in coverage. We calculated the frequency of lapses in coverage for those with public and private insurance plans. Among the publicly insured, we then examined the association between demographic characteristics and plan experiences and having had a lapse using odds ratios and 95 % confidence intervals [CI]. We also examined the association of experiencing a lapse and potential economic and medical harms in the same manner.

RESULTS: Of publicly insured patients, 25.9 % experienced a lapse in their current insurance plan, compared with 3.8 % of privately insured patients. Among publicly insured patients who experienced a lapse, 44.9 % reported having to delay or forego medical care due to this lapse. The frequency of lapses did not differ between Medicaid and Commonwealth Care insured patients. We found no association between age, gender, English as the primary spoken language or race; US-born patients were more likely to experience a lapse than foreign-born patients (30 % vs 22 %, OR=1.4, 95 % CI=1.1–1.8), however. Having to fill out additional paperwork to maintain enrollment and having difficulty with completing paperwork were both associated with greater likelihood of experiencing a lapse (34 % vs 19 %, OR=1.8, 95%CI=1.3–2.4 and 42 % vs 29 %, OR=1.4, 95 % CI=1.0–1.9, respectively). We found, in turn, that experiencing a lapse was associated with a greater likelihood of being contacted by bill collectors for medical costs (30 % vs 14 %, OR=2.0, 95%CI=1.5–2.6) and with delaying or foregoing primary care or medication purchases due to cost (11.2 % vs 5.0 %, OR=2.2 95%CI=1.3–4.0 and 19.4 % vs 11.3 %, OR 1.7, 95 % CI=1.2–2.6, respectively).

CONCLUSIONS: High rates of lapses seen in prior studies of public insurance programs persist in public insurance programs that were expanded (Medicaid) or created (Commonwealth care) under the Massachusetts health care reform. These lapses limited access

to care and were associated with economic harms for patients. In Massachusetts public insurance programs should seek to minimize lapses, perhaps in part through better enrollee education and minimizing the burden of paperwork.

PREVALENCE OF CARDIOVASCULAR EVENTS IN PATIENTS WITH CANCER: ANALYSIS OF 12-YEAR DATA FROM NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 1999–2010 Saurabh Aggarwal^{1,2}; Rohit S. Loomba⁵; Navdeep Gupta⁵; Anushree Agarwal⁶; Gaurav Aggarwal⁸; Venkata M. Alla³; Manu Kaushik²; Claire Hunter³; Syed Mohiuddin³; Dennis Esterbrooks¹; Rohit Arora⁷; Aryan Mooss⁴. ¹Creighton University, Omaha, NE; ²Creighton University Medical Center, Omaha, NE; ³Creighton University School of Medicine, Omaha, NE; ⁴Creighton University School of Medicine, Omaha, NE; ⁵Medical College of Wisconsin, Milwaukee, WI; ⁶University of California-San Francisco, San Francisco, CA; ⁷Chicago Medical School, North Chicago, IL; ⁸Armed Forces Medical College, Pune, India. (Tracking ID #2199024)

BACKGROUND: Cardiovascular disease (CVD) & cancer are the leading causes of morbidity and mortality. We sought to assess any association present between the two in a nationally representative sample.

METHODS: We utilized data from National Health & Nutrition Examination Survey (NHANES) 1999–2010 database. Patients were divided into cancer positive & cancer negative groups based on self-reported cancer history. Patients were excluded if they were <18 years of age and if no response for cancer history was captured. Multiple imputations were used for missing values. Baseline characteristics, prevalence of angina, coronary artery disease (CAD) & congestive heart failure (CHF), and history of myocardial infarction (MI) and stroke were compared between the two groups.

RESULTS: A total of 32,428 patients with complete data were included in final analysis. On univariate analysis, patients with self-reported history of cancer were found to have higher prevalence of angina, CAD, CHF and history of MI and stroke [table]. However, on multivariable logistic regression, no independent association was found after adjusting for age, gender, race, total cholesterol, HDL, LDL, systolic blood pressure, smoking status, diabetes mellitus and body mass index.

CONCLUSIONS: In this large nationally representative sample, patients with history of cancer had higher prevalence of CVD disease. However, a direct association between history of cancer and CVD disease is not established after correcting for CVD risk factors.

Odds ratio for prevalence of cardiovascular events in patients with history of cancer

	Angina	Coronary artery disease	Heart failure	Myocardial infarction	Stroke
Univariate odds ratio and 95% confidence interval	2 . 7 9 (2.40 to 3.25)*	2.84 (2.5 to 3.25)*	2 . 7 9 (2.41 to 3.24)*	2.85 (2.50 to 3.25)*	2 . 7 5 (2.39 to 3.17)*
Univariate p-value	< 0.001*	< 0.001*	< 0.001*	< 0.001*	< 0.001*
Adjusted odds-ratio and 95% confidence interval	1 . 2 3 (0.89 to 1.69)	1.04 (0.78 to 1.38)	1 . 1 8 (0.85 to 1.64)	1.07 (0.81 to 1.42)	1 . 1 5 (0.85 to 1.56)
Adjusted p-value	0.210	0.816	0.318	0.628	0.351

*statistically significant

PREVENTING DIABETES IN PRIMARY CARE: PROVIDERS' PERSPECTIVES ABOUT THE VALUE OF DIAGNOSING AND TREATING PREDIABETES Namratha R. Kandula; Margaret R. Moran; Joyce W. Tang. Northwestern University, Chicago, IL. (Tracking ID #2191304)

BACKGROUND: Seventy-nine million people in the U.S. have prediabetes, and within 3 years, 11 % of these individuals will go on to develop type 2 diabetes mellitus (DM). Current guidelines recommend screening for prediabetes and DM, but population-based studies show that only 10 % of patients with prediabetes are aware of their diagnosis. Primary care is potentially an ideal setting for identifying patients with prediabetes and educating them about how to reduce their risk for DM. However, little is known about primary care providers' (PCPs') perspectives on DM prevention. We investigated PCPs' perspectives about the value of diagnosing and treating prediabetes in primary care.

METHODS: This study was a part of a qualitative investigation of patient and PCP experiences with and perspectives on DM prevention. Fifteen primary care providers (14

physicians and one nurse practitioner) were recruited from 2 primary care clinics using emailed recruitment letters. We conducted in-depth interviews using a semi-structured interview guide. The guide was designed to elicit PCPs' values, preferences, knowledge, experience, and approach to DM prevention. The study team developed a coding guide a priori that was iteratively refined while reviewing the first set of interviews. Digital audio files of the interviews were transcribed verbatim. Transcripts were coded and analyzed utilizing template analysis. All interviews were coded by at least 2 members of the study team (NK, MM, or JT). All coding and qualitative analysis was performed using NVivo qualitative data analysis software (QSR International Pty Ltd. Version 10, 2012) to organize the data.

RESULTS: We identified three major themes related to the value of identifying prediabetes in primary care: 1) Providers said that a diagnosis of prediabetes was a "wake-up call" for patients and an important opportunity to educate and intervene. For example, "I think it is good for people to know **now**, before they have diabetes. Some providers are of the mindset, 'oh I don't want to scare the patient, they don't actually have diabetes.' I don't agree with that. I think that changes made earlier so we can prevent are helpful, rather than coming in and finding their A1c is 8 or 9 and they really have diabetes and then they have to go on medication." 2) Other PCPs felt that focusing on prediabetes was potentially a waste of resources because the scientific evidence did not show that finding and treating prediabetes prevented serious, long-term complications, such as heart attack, kidney failure, or death. These PCPs felt that resources should be focused on patients who already had DM or on treating established cardiovascular risk factors. 3) Another key theme was that the importance of DM prevention varied by patient. For patients with few or no comorbidities, a prediabetes diagnosis was seen as a concrete way to motivate patients to lose weight; in contrast, providers perceived that the diagnosis of prediabetes may add less value for patients with multiple co-morbidities. A provider said, "he (the patient) is very complicated, and so given his other medical issues, I was trying to figure out whether to even bring up the issue of prediabetes with him. I don't even know that I want to give him one more thing to think about. I honestly didn't even mention it." Several providers also voiced the belief that prediabetes was a public health or societal problem that could not be effectively treated in primary care. PCPs voiced frustration that patients generally did not have access to intensive, evidence-based lifestyle interventions, such as the Diabetes Prevention Program: "So, I think it's all well and good, but it just doesn't match my reality. If I could write a script for 'do lifestyle therapy as they prescribed with 7 % of body weight,' as easily as I can write a prescription for Metformin, and people would actually do it, and their insurer would pay for it or it would be affordable, I would do that every time, but I can't even get out the door on most of these things."

CONCLUSIONS: We identified substantial variation among PCPs' perspectives about DM prevention. The value of diagnosing and educating patients about prediabetes was influenced by several factors: PCPs' belief that this was an opportunity to motivate lifestyle change, PCPs' prioritization of other cardiovascular risk factors, how providers interpreted the science behind DM prevention, patient comorbidities, and patient access to effective lifestyle interventions. Efforts to increase DM prevention screening in primary care should focus on improving PCPs' ability to easily refer patients to low-cost, evidence-based lifestyle interventions, and should consider approaches that help target DM prevention towards patients who are most likely to benefit (e.g., those with few co-morbidities).

PRIMARY CARE ACCESS BEFORE AND AFTER MEDICAID EXPANSION UNDER THE AFFORDABLE CARE ACT Renuka Tipirneni²; Karin V. Rhodes⁴; Rodney A. Hayward^{1,2}; Richard L. Lichtenstein¹; Elyse Reamer^{3,2}; Matthew M. Davis². ¹U. Michigan, Ann Arbor, MI; ²University of Michigan, Ann Arbor, MI; ³University of Michigan Medical School, Ann Arbor, MI; ⁴University of Pennsylvania, Philadelphia, PA; ⁵University of Michigan School of Public Health, Ann Arbor, MI. (Tracking ID #2195650)

BACKGROUND: The Patient Protection and Affordable Care Act (ACA) provides for expansion of health insurance coverage to millions of Americans, but availability of health care services for the newly insured remains uncertain. This study examines primary care appointment availability and wait times for new Medicaid and privately insured patients before versus after implementation of Medicaid expansion in Michigan.

METHODS: We conducted a simulated patient ("secret shopper") study, in which trained research staff called a stratified proportionate random sample of primary care practices (N=295) to request a new patient appointment before (March 2014) and after (July-August 2014) Medicaid expansion implementation in Michigan on April 1, 2014. The sampling frame included clinics that care for adult patients, such as internal medicine or family medicine clinics, because the working age population is the target group gaining coverage under the ACA. For clinics that accepted new Medicaid patients, we used simulated patient calls to assess wait times for appointments (difference in calendar days between call and appointment dates). Clinics were called twice during each data collection period, once by a simulated patient with Medicaid and once by a simulated patient with private insurance.

RESULTS: During the study period, nearly 350,000 adults enrolled in Medicaid expansion health plans in Michigan, representing 33 % of the state's previously uninsured non-elderly adult population. Compared with the period immediately before Medicaid expansion, appointment availability for new Medicaid patients increased from 49 to 55 % (absolute difference +6 %, 95 % CI +1.2 to +9.1 %, $p=0.005$) while availability for new privately insured patients decreased slightly from 88 to 86 % (absolute difference -2 %, -0.1 to -4.0 %, $p=0.01$). When offered an appointment, median wait times for both new Medicaid and new privately insured patients increased slightly after expansion, but these changes were not statistically significant (8 to 12 days for Medicaid, $p=0.15$; 7 to 11 days for private, $p=0.13$).

CONCLUSIONS: During a period of rapid insurance coverage expansion, primary care appointment availability for new Medicaid patients improved and wait times remained reasonable to ensure access to primary care. Follow-up data collection (next scheduled for March 2015) will indicate whether access to primary care will endure as new patients enter the system under Medicaid expansion.

PRIMARY CARE PROVIDERS IN NEW MEXICO ARE CONCERNED ABOUT IMPLEMENTING LOW-DOSE CT LUNG CANCER SCREENING Richard Hoffman¹; Andrew Sussman¹; Robert Rhyné¹; Christina Getrich²; Kathryn L. Taylor³; Shiraz I. Mishra¹. ¹University of New Mexico School of Medicine, Albuquerque, NM; ²University of Maryland, College Park, MD; ³Georgetown University, Washington, DC. (Tracking ID #2190737)

BACKGROUND: Lung cancer is the leading cause of cancer death in the United States. Cancer control efforts have traditionally focused on stopping or preventing tobacco use, because tobacco contributes to over 80 % of lung cancer deaths. Unfortunately, screening with chest x-rays (CXR) and/or sputum cytology has not been proven effective in reducing lung cancer mortality. However, the National Lung Screening Trial (NLST) recently found that three rounds of annual screening with low-dose computed tomography (LDCT) significantly reduced the risk of lung cancer death in heavy smokers ages 55 to 74 compared to annual CXR screening. Consequently, guidelines issued by organizations such as the U.S. Preventive Services Task Force (USPSTF) and the American Cancer Society (ACS) now recommend screening high-risk smokers with LDCT. Because translating research results to routine practice is challenging, we characterized the knowledge, attitudes, and beliefs of primary care providers about implementing LDCT screening.

METHODS: We conducted qualitative in-depth, semi-structured interviews with providers practicing in New Mexico clinics for underserved minority populations. Using a purposeful sampling approach, we identified rural and urban clinicians who primarily see Hispanic patients meeting criteria for LDCT screening. We conducted audio-taped interviews from February through September 2014 that focused on the providers' tobacco cessation efforts; lung cancer screening practices; perceptions of NLST results and guideline recommendations; and attitudes about decision-making. Investigators iteratively reviewed transcripts to create an initial coding structure; transcripts were then imported into NVivo10, a qualitative data analysis program, for final coding.

RESULTS: We reached thematic saturation after interviewing 10 primary care providers practicing in urban ($n=6$) or rural ($n=4$) settings; 8 practiced at Federally Qualified Health Centers. All promoted smoking cessation; a few screened with CXR though none with LDCT. Not all were aware of NLST results or current guideline recommendations. They viewed study results skeptically, particularly the 95 % false-positive rate, the absolute mortality benefit of only 3/1000, the high proportion of academic sites, and the small proportion of minority participants. The NLST results were not seen as providing sufficient evidence to justify the USPSTF guidelines; providers were also generally wary of new cancer screening guidelines given the controversies over prostate and breast cancer screening recommendations. Providers were uncertain whether New Mexico had the necessary infrastructure to support high-quality screening, and worried about access barriers and financial burdens for rural, underinsured populations. While recognizing that the Affordable Care Act provides first-dollar coverage for screening tests, providers expressed concern about the potentially prohibitive out-of-pocket costs for subsequent diagnostic testing and procedures. Providers noted the complexity of discussing benefits and harms of screening and surveillance and believed that it would be challenging to

support low-literacy patients in making informed decisions. Some questioned allocating resources to screen older smokers rather than to target smoking cessation and prevention interventions for the young.

CONCLUSIONS: Providers were not well informed about NLST trial results and screening guidelines, but raised many concerns about the feasibility and appropriateness of implementing LDCT screening, particularly in a state with limited health care resources. Effective screening programs will need to educate providers and patients to support informed decision making and to ensure that high-quality screening can be efficiently delivered in community practice.

PROMOTING PROPER UTILIZATION OF EARLY DETECTION TECHNOLOGY IN THE ACUTE CARE SETTING Graham Lowenthal; Patricia C. Dkys; Stuart R. Lipsitz; Catherine Yoon. Brigham and Women's Hospital, Boston, MA. (Tracking ID #2191446)

BACKGROUND: If utilized properly, patient monitoring systems designed for early detection and alerting of clinical decompensation may contribute to better quality of care, length of stay, and healthcare cost outcomes.^[1,2] In January of 2013, an early detection system was implemented on all adult medical-surgical beds in an Eastern Massachusetts acute care hospital. The purpose of this study was to identify barriers to implementation of the early detection system and to develop strategies to maximize proper utilization. References: 1) Brown H, Terrence J, Vasquez P, Bates DW, Zimlichman E. Continuous monitoring in an inpatient medical-surgical unit: a controlled clinical trial. *Am J Med.* 2014 Mar;127(3):226-32. 2) Slight SP, Franz C, Olugbile M, Brown HV, Bates DW, Zimlichman E. The return on investment of implementing a continuous monitoring system in general medical-surgical units. *Crit Care Med.* 2014 Aug;42(8):1862-8.

METHODS: We established a committee of stakeholders (physicians and nurse champions), researchers, and vendor partners. This committee hosted regular meetings to identify barriers that could impede successful use of the system. We developed strategies for overcoming each identified barrier, using a Plan Do Study Act (PDSA) framework, a cyclical model for developing, testing, adjusting, and retesting improvement approaches.^[3] In order to test each strategy, we established goals and process measures, and reported out on progress during our next meeting. We measured overall progress by tracking use of the system and response times to system alerts. After gathering feedback, we adjusted our approach by revising preexisting goals or setting new ones. References: 3) Patient Safety—Quality Improvement [Internet]. Durham (NC): Department of Community and Family Medicine, Duke University Medical Center. 2014-. Part A, What is quality improvement?; [cited 2015 Jan 5]; [about 3 screens]. Available from: http://patientsafetyed.duhs.duke.edu/module_a/methods/pdsa.html

RESULTS: The barriers we identified as limiting successful implementation of the early detection system, and strategies we developed to overcome them, are included in Table 1. Units made numerous improvements as new barriers were identified and strategies to work through them were developed and tested. We found that the strategies we implemented led to more frequent, and more correct, use of the technology. Monthly mean response times to system alerts improved between January and November of 2014. Overall monthly mean response times decreased from 88 (range: 17 to 362) to 51 (range: 2 to 157) minutes. Cardiac alert responses improved from 93 (range: 17 to 312) to 35 (range: 2 to 84) minutes. Respiratory alert responses decreased from 87.5 (range: 28 to 362) to 53 (range: 9 to 157) minutes. Communication of the system also improved, especially within the electronic health record and multidisciplinary rounds. Regular teaching sessions have contributed to greater awareness of and familiarity with using the system and features. Attitudes toward accepting and using the system were more positive as well. Staff members became increasingly more enthusiastic about achieving goals and more engaged in discussion of utilization and planning next steps.

CONCLUSIONS: Our Plan Do Study Act framework was effective for overcoming barriers to proper utilization of early detection technology in the acute care setting. Since implementing the PDSA methodology, we have seen continuous improvement in system use and alert response times. Our PDSA model was successful overall, but each individual unit exhibited varying levels of progress using the strategies we developed. Some units excelled with the system, while others repeatedly struggled to improve practice and response times. We will continue using our PDSA framework to support proper system utilization and to decrease unit response times.

Table 1: Identified Barriers to Proper Utilization of Early Detection Technology, and Strategies Developed to Overcome Them

Identified Barriers	Strategies Developed to Overcome Barriers
Inadequate Training/Education	<ul style="list-style-type: none"> ● Kickoff Event, emphasizing the system's importance and proper utilization ● Regular Didactic and Hands-on Teaching sessions for promoting awareness of and familiarity with using system and features
Lack of Physician Involvement	<ul style="list-style-type: none"> ● Integrated system reporting and scripted discussion into multidisciplinary rounds ● Physician peer counseling on use of system
Inability to See Device's Value	<ul style="list-style-type: none"> ● Reviewed recent "saves" (device's detection of early patient decompensation that alerted staff to intervene and prevent worsening/emergency health problems) during champions meetings to promote perceived value
Clinical Workflow Challenges	<ul style="list-style-type: none"> ● Involved physicians and nurse champions in identifying workflow challenges and solutions ● Physicians and nurse champions led practice redesign efforts
Alarm Fatigue	<ul style="list-style-type: none"> ● Educated staff on proper alerts management ● Implemented protocol enabling nurses to change device settings within specified limits to reduce unnecessary alerts
Pagers ("Just one more thing to carry")	<ul style="list-style-type: none"> ● Multiple methods of receiving alerts give staff option to carry pagers or regularly check status boards in halls ● Response times are continuously monitored and feedback is provided to help each unit determine whether to continue with, or reevaluate, current practice
Lack of Communication	<ul style="list-style-type: none"> ● Alerts being integrated into nurses' phones ● Incorporated system reporting into EHR to keep staff up-to-date at shift change ● Champions share content of committee meetings with units ● Partnership with vendor to address challenges
Multiple Conflicting Priorities	<ul style="list-style-type: none"> ● Reaffirmed and aligned leadership support at every level of the organization, from top to bottom (Hospital Leadership → Unit Leadership → Staff RNs → Multidisciplinary Team)

PSYCHOLOGICAL SYMPTOMS AND RELIGIOSITY IN PATIENTS WITH VENTRICULAR ASSIST DEVICES: A COHORT STUDY Himali Weerahandi¹; Nathan Goldstein²; Laura P. Gelfman²; Ulrich Jorde³; James N. Kirkpatrick⁴; Judith Marble⁵; Yoshifumi Naka⁶; Sean Pinney¹; Mark S. Slaughter⁷; Emilia Bagiella¹; Deborah D. Ascheim¹. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Icahn School of Medicine at Mount Sinai, New York, NY; ³Montefiore Medical Center, Bronx, NY; ⁴Hospital of the University of Pennsylvania, Philadelphia, PA; ⁵University of Pennsylvania, Philadelphia, PA; ⁶Columbia University, College of Physicians and Surgeons, New York, NY; ⁷Jewish Hospital Louisville, Louisville, KY. (Tracking ID #2196096)

BACKGROUND: Ventricular assist devices (VADs) are increasingly used to treat heart failure (HF) patients with advanced disease. While these devices have been shown to improve survival and quality of life in patients with advanced HF, there are little data exploring the psychological symptoms of these patients, and there have been no studies examining religiosity in this patient population.

METHODS: Patients were enrolled in this cohort study immediately before or after VAD implant to determine baseline prevalence of symptoms of patients, and then followed at regular intervals for up to 21 months after VAD placement to determine how these symptoms change over time. Patients were eligible for the study if they were age 21 and older, had a planned LVAD implant or had an LVAD implanted within 6 months, were fluent in English, had a caregiver or family member who was willing to be enrolled (for outcomes not shown), and had consistent and reliable access to a phone. Outcomes related to religion were obtained through structured patient interviews. Depression and anxiety were assessed with PROMIS SF8a questionnaires. The panic disorder, acute stress disorder (ASD) and post-traumatic stress disorder (PTSD) modules of the Structured Clinical Interview for the DSM (SCID) were also used. Generalized estimating equations (GEE) were used to examine relationship of scores to time.

RESULTS: Eighty-seven patients were enrolled at four clinical sites; mean age was 57.7, and 29.3 % were African-American. The indications for VAD placement were bridge to transplant (40.2 %), destination therapy (49.3 %) and unknown (10.3 %). At the end of the study period, 6.9 % of the patients died and 16.7 % received a cardiac transplant. Mean religiosity score was as high as 9.4 (SD 0.9) out of 10 (at 3 months post implant; range over time: 5.8–9.4). They also rated that their medical team supported their spiritual needs to a moderate extent. However, the relative risk of these patients receiving pastoral care services while in the hospital was 0.14 (SD 0.4). Mean depression t-scores were 51.9 (SD 8.5) pre-implantation, and 43.9 (SD 6.4) at 12 months post-implantation. A GEE model demonstrated that the score decreased by 0.8 points at each time interval post LVAD implantation ($p=0.04$). Mean anxiety t-scores were 54.0 (SD 10.7) pre-implantation, and 42.4 (SD 9.4) at 12 months post-implantation. A GEE model demonstrated that the score decreased by 2.09 points at each time interval going forward ($p<0.001$). Only 2 patients met criteria for panic disorder after implantation, and these patients' symptoms resolved over time. No patients met criteria for ASD or PTSD.

CONCLUSIONS: This study demonstrated that these patients were fairly religious and felt that the medical team supported their spiritual needs, even though they rarely received pastoral services in the hospital. In addition we found that anxiety and depression decreased over time for patients implanted with a VAD. There was also a low incidence of ASD and PTSD, and panic disorder. Anxiety also improved over time. Undergoing a major procedure may produce anxiety or other psychological harm. However, our study demonstrates that the VAD implantation does not appear to cause or worsen these outcomes. The incidence of panic disorder is lower than in both the general population and the general heart failure population. This may be because we selected a group of patients that have a known caregiver, which may affect the prevalence of psychiatric disorders. This finding warrants further investigation. Given that religion is important source of support to these patients, increasing access to religious services while hospitalized could improve the quality of care.

PULLING TEAMS TOGETHER: INTERPROFESSIONAL TEAMWORK AND THE CHALLENGES FACED BY HOSPITALS, PROVIDERS, AND PATIENTS

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BACKGROUND: Interprofessional teamwork is a basic component of healthcare; physicians and other providers need to directly and indirectly coordinate and collaborate with each other to care for patients. However, this necessary coordination and collaboration often depends primarily on the diligence of providers, who must exercise their own individual skills in teamwork to reach across professional boundaries and overcome systemic challenges. Ethnography has proved a useful method of studying healthcare teams in practice; previous ethnographic research has focused on information systems and teamwork in settings where teams are well-defined (such as ORs). Additional research is needed to define what teamwork means and how it is achieved in other contexts, particularly for groups such as hospitalist physicians, for whom teamwork is a core competency, with distinct challenges.

METHODS: We conducted ethnographic fieldwork with a sample of 4 hospitalists in 3 hospitals in a single US metropolitan area. Sites and participants were selected to represent a range of practice types and settings (academic/non-academic; urban/suburban; large research / small community hospital). This entailed close observation in practice over the course of approximately 7 days with each physician, for a total of 160 h of data collection. Fieldwork was led by a team led by a PhD cultural anthropologist with extensive experience in observing healthcare providers; other team members provided expertise in medicine, public health, psychology, and usability research. We recorded detailed fieldnotes describing observations and conversational interviews with providers in context. We conducted qualitative, iterative analysis of all data using the constant comparative method, during and after fieldwork, to identify themes and illustrative quotes and incidents. We also presented a preliminary analysis to providers at the fieldsites, which allowed for refinement of the analysis to incorporate informants' perspectives.

RESULTS: Hospital providers work in conditions that often undermine effective teamwork in a variety of reasons: geographically scattered patients, unreliable information systems and ordering processes, fragmented care teams, and lack of consistent formal support for effective teamwork. These conditions can pose threats to the timeliness, efficacy and safety of the care that patients receive, especially at transition points when patients or patient information must move between departments within the hospital or between the hospital and other institutions. Providers must exercise of a great deal of individual effort to mitigate these challenges; individuals may innovate ways to improve their teamwork, but these are not typically tested or shared, even with close collaborators. Beyond the burden on providers, these conditions can pose serious problems for patients and their family members, who may need to play a critical, active role in coordinating their own care to make up for the system's shortcomings. However, these expectations put on

patients and family members are rarely clearly stated; they may not be aware of their role on their own care team, or fully able to fulfill that role.

CONCLUSIONS: Expectations for the practice of effective teamwork and how to overcome common challenges must be acknowledged and taught. Systems for sharing information and coordinating care within and between institutions, and mechanisms for identifying and resolving conflicts within members of the care team, must be strengthened. Expectations for the roles that care providers, patients and family members play must be clarified and made explicit, and support in fulfilling these roles must be provided by healthcare providers and the organizations within which they work.

QUALITY OF END-OF-LIFE CARE PROVIDED TO PATIENTS WITH DIFFERENT LIFE-LIMITING CONDITIONS IN THE VETERANS HEALTH ADMINISTRATION Melissa W. Wachterman³; Corey Pilver⁴; Dawn Smith⁵; Stuart R. Lipsitz⁶; Mary Ersek^{2,5}; Nancy L. Keating^{1,6}. ¹Harvard Medical School, Boston, MA; ²University of Pennsylvania School of Nursing, Philadelphia, PA; ³VA Boston Healthcare System, Jamaica Plain, MA; ⁴VA Boston Healthcare System, Boston, MA; ⁵Philadelphia VA Medical Center, Philadelphia, PA; ⁶Brigham and Women's Hospital, Boston, MA. (Tracking ID #2191203)

BACKGROUND: Historically, patients with cancer have been the primary focus of efforts to improve end-of-life (EOL) care; however, with the aging of the U.S. population, high quality EOL care for patients with other life-limiting conditions is increasingly important. There is an emerging set of quality measures in EOL care (such as palliative care consultation and bereaved family evaluation of care), but little is known about the relative quality of EOL care across different life-limiting conditions. Our objective was to evaluate the quality of EOL care provided to patients with different life-limiting conditions within the nation's largest healthcare system, the Veterans Health Administration (VA). Quality of EOL care was measured using the validated Bereaved Family Survey and several chart-based measures.

METHODS: We contacted the next of kin of all 57,342 Veterans who died in one of the 146 VA hospitals or long-term care facilities nationwide during 2010–2012. Our final sample included 33,768 Veteran decedents for whom we received a completed Bereaved Family Survey (response rate 58.9 %). We categorized Veterans as having one of six life-limiting conditions: end-stage renal disease (ESRD), cancer, cardiopulmonary failure (congestive heart failure and chronic obstructive pulmonary disease), dementia, frailty, and other causes. Chart review-based quality measures included: 1) palliative care con-

sultation in the last 3 months of life; 2) death in the intensive care unit (ICU); and 3) do-not-resuscitate (DNR) status at the time of death. Survey-based quality measures included families' reports of: 1) excellent care in the last month of life and 2) frequent uncontrolled pain in the last month of life. We used multivariate logistic regression to compare these EOL quality measures for patients with different life-limiting conditions, controlling for demographic factors and medical comorbidity. We then generated adjusted proportions based on these multivariate adjusted models. All analyses were weighted to account for survey non-response, yielding estimates representative of the full population of Veterans dying in VA facilities.

RESULTS: Among 33,768 Veteran decedents, 6.0 % of decedents' life-limiting condition was ESRD, 44.0 % cancer, 26.0 % cardiopulmonary failure (CHF and COPD), 4.4 % dementia, 11.1 % frailty, and 8.5 % other causes. The cohort was 97.9 % male, 75.2 % non-Hispanic white, with a mean age of 74.1. As shown in the Table, life-limiting condition was significantly associated with all chart review-based and survey-based outcomes (adjusted $P < .001$). The adjusted proportion of patients receiving a palliative care consult was highest among cancer patients (69.8 %) and dementia patients (61.5 %), while less than half of patients with ESRD, cardiopulmonary failure, and frailty received such consults. The adjusted proportion of patients dying in the ICU was lowest among cancer patients (16.1 %) and dementia patients (11.0 %), while about one-third of patients with ESRD, cardiopulmonary failure, and frailty died in the ICU. The adjusted proportion of patients with a DNR order at death was highest among cancer patients (94.6 %) and dementia patients (93.5 %), compared to 87–88 % for other conditions. The adjusted proportion of family members reporting that care in the last month of life was excellent was highest among those of patients with cancer (57.7 %) and dementia (59.2 %) and lowest among patients with ESRD (53.8 %) and cardiopulmonary failure (53.5 %).

CONCLUSIONS: Quality of EOL care, both in terms of objective measures and family-reported quality, varied by life-limiting condition and was generally highest for dementia and cancer patients, and lowest for patients with CHF, COPD, and ESRD, independent of demographic factors and medical comorbidity. Patients with CHF, COPD, and ESRD were significantly less likely than patients with cancer or dementia to be seen by palliative care, to have a DNR order, and to receive excellent care in the last month of life according to family, and were more likely to die in the ICU. These findings suggest that expanding the scope of palliative care and high-quality EOL care for patients with CHF, COPD, and ESRD should be a priority for both clinicians caring for patients at the end of life and policymakers.

Outcome	ESRD	Cancer	Cardiopulmonary Failure	Dementia	Frailty	Adjusted P-value
Weighted % of sample	6.0	44.0	26.0	4.4	11.1	NA
Chart Review Quality Measures(Adjusted %)						
Palliative consult	48.8	69.8	47.5	61.5	47.1	<.001
Death in the intensive care unit	35.6	16.1	33.9	11.0	30.4	<.001
DNR order at death	87.9	94.6	87.0	93.5	87.7	<.001
Bereaved Family Survey Quality Measures(Adjusted %)						
"Excellent care" in last month of life	53.8	57.7	53.5	59.2	55.5	<.001
Frequent uncontrolled pain	46.7	49.1	45.3	39.8	44.1	<.001

"Other causes" (8.5 % of sample) omitted from table. All proportions are adjusted for age, race, sex, survey respondent's relationship to decedent, and number of comorbidities. P-values are for overall association between life-limiting condition and each outcome after adjustment.

QUALITY OF LIFE, FUNCTIONAL STATUS, AND PAIN OVER TIME IN PATIENTS WITH VENTRICULAR ASSIST DEVICES: A COHORT STUDY Himali Weerahandi¹; Nathan Goldstein²; Laura Gelfman²; Ulrich Jorde³; James N. Kirkpatrick⁴; Judith Marble⁵; Yoshifumi Naka⁶; Sean Pinney¹; Mark S. Slaughter⁷; Emilia Bagiella¹; Deborah D. Aschheim¹. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Icahn School of Medicine at Mount Sinai, New York, NY; ³Montefiore, Bronx, NY; ⁴Hospital of the University of Pennsylvania, Philadelphia, PA; ⁵University of Pennsylvania, Philadelphia, PA; ⁶Columbia University, College of Physicians and Surgeons, New York, NY; ⁷Jewish Hospital Louisville, Louisville, KY. (Tracking ID #2188070)

BACKGROUND: Ventricular assist devices (VADs) are used to treat advanced heart failure (HF) patients both as a bridge to cardiac transplantation and for those ineligible for transplantation. These devices have been shown to improve survival, but to our knowledge, there is limited data on pain control in this patient population. In addition, the literature on quality of life and functional status over time is limited to small studies.

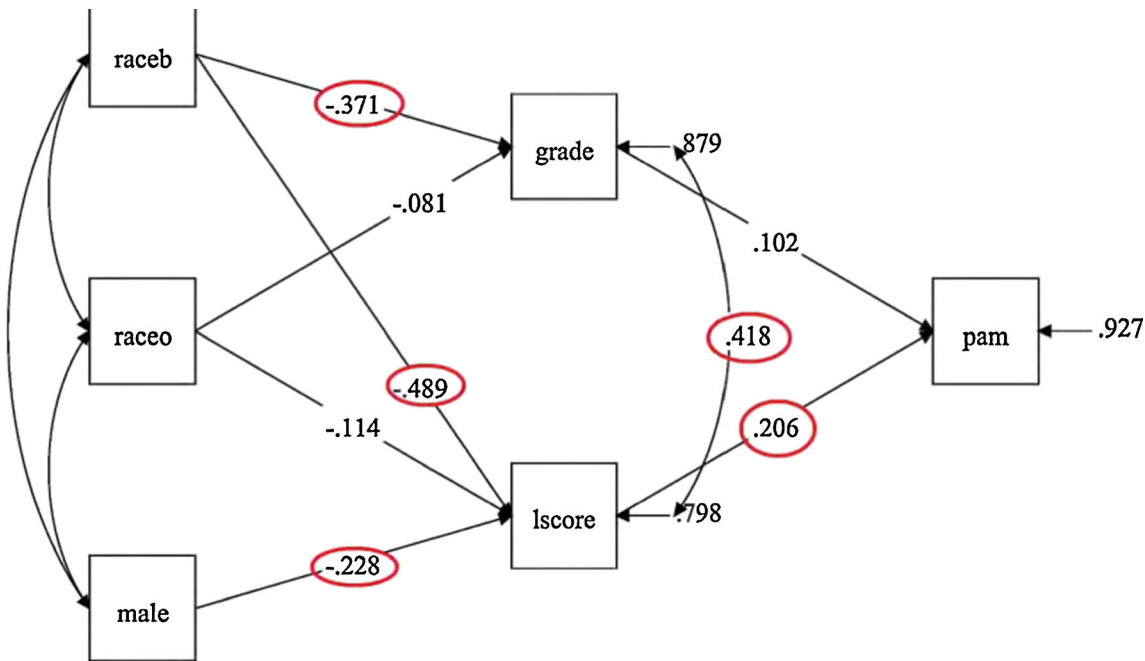
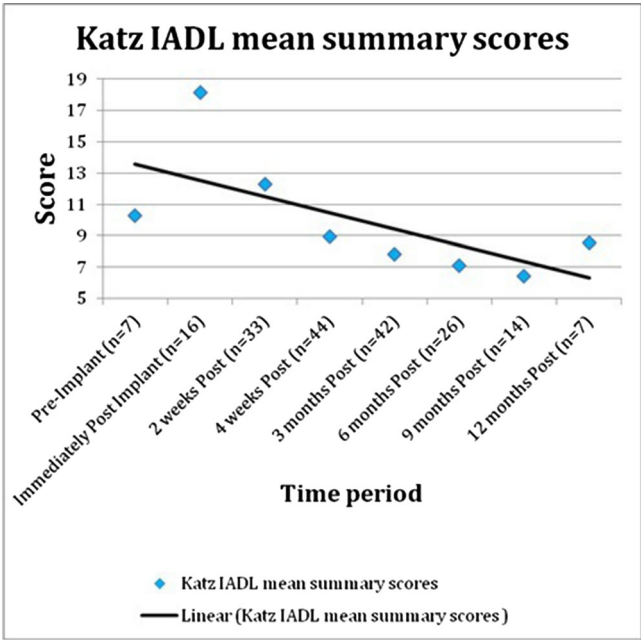
METHODS: A 4-center cohort study of patients with VADs was performed. Patients were enrolled immediately before or after VAD implant to determine baseline symptoms of patients and then followed at regular intervals for up to 21 months after VAD placement to determine how these characteristics change. Patients were eligible for this study if they were aged 21 and older, and were fluent in English, had a caregiver or family member who was willing to be enrolled (for outcomes not shown), and had consistent and reliable access to a phone. The Brief Pain Inventory (BPI), a 23-item questionnaire, was used to assess pain. The Kansas City Cardiomyopathy Questionnaire (KCCQ), a 23-item questionnaire covering 5 domains (physical function, symptoms, social function, self-efficacy, and quality of life) was used to assess quality of life and health status. The Katz Independent Activities of Daily Living questionnaire was used to assess functional status. Generalized estimating equations (GEE) examined relationship of scores to time.

RESULTS: Eighty-seven patients were enrolled in this study; mean age was 57.7, 21.8 % were women, and 29.3 % were African-American. The mean BPQ score was 2.4 (SD 2.4) out of 10 (with 10 representing worst pain) before implantation, 3.7 (SD 2.9) immediately after implantation, and 2.0 (SD 2.5) 12 months after implantation. A GEE model using time to predict pain score demonstrated that the score decreased by 0.32 points at each time interval going forward ($p = .002$). Mean BPQ score representing how much pain interferes with activity was 3.7 (SD 3.9) out of 10 (with 10 representing worst pain) before implantation, 2.9 (SD 3.2) immediately after implantation, and 0.2 (SD 0.4) at 12 months

after implantation. A GEE model using time to predict pain score demonstrated that the score decreased by 0.43 points at each time interval going forward ($p<0.0001$). KCCQ summary scales demonstrated improvement with time. A GEE model using time to predict score demonstrated that the overall summary score increased by 3.38 points at each time interval going forward ($p=.0003$). Katz IADL summary scores also demonstrated improvement over time. A GEE

model using time to predict score demonstrated that the summary score decreased by 1.2 points at each time interval going forward ($p<0.0001$).

CONCLUSIONS: This study demonstrated that VAD implanted patients experienced improved pain, quality of life, health status and functional status over time. These data may be useful in helping patients in decision making when considering whether VAD implantation may meet their goals of care.



QUALITY OF REPORTING OF RANDOMIZED CONTROLLED TRIAL ABSTRACTS AMONG LEADING GENERAL MEDICINE JOURNALS: A REVIEW AND ANALYSIS Meredith A. Hays³; Kevin M. Douglas¹; Mary Andrews⁴; Ramey L. Wilson⁴; Lynn Byars²; David M. Callender⁵; Patrick G. O'Malley². ¹USUHS, Potomac, MD; ²Uniformed Services University, Washington, DC; ³WRNMMC, Kensington, MD; ⁴Walter Reed National Military

Medical Center, Bethesda, MD; ⁵Walter Reed National Military Medical Center, Washington, DC. (Tracking ID #2194050)

BACKGROUND: The Consolidated Standards of Reporting Trials (CONSORT) for Abstracts statement was designed to improve reporting of Randomized Controlled Trial (RCT) abstracts, allowing readers to quickly assess the validity and applicability of the

trial results. CONSORT was endorsed by the top five high-impact general medicine journals (ranked by the reported ISI impact factor of 2014). Our primary goal was to determine adherence to the CONSORT guidelines by these journals.

METHODS: We conducted a descriptive, cross-sectional study of RCT abstracts published between 2011 and 2014 in the five highest-impact general medicine journals. Abstracts were assessed for adherence to a 19-item checklist based on the CONSORT for Abstract reporting guidelines. After establishing inter-rater agreement using 30 RCT abstracts published prior to 2011, an author (KD) not involved in abstract scoring searched PubMed to identify up to 100 of the most recent RCTs published between January 1, 2011 and December 1, 2014 in each journal. A collaborator not involved in abstract scoring or data analysis ensured that reviewers were blinded to the journal of publication by removing PMID, journal name, author names, and journal-specific subheadings from study abstracts. Study abstracts were randomly ordered using a computer-generated sequence and divided among the three reviewers (MA, MH, RW). Each abstract was scored by a single reviewer using the 19-item checklist. Proportion of abstracts adherent to each checklist item was calculated for the entire sample and for the abstracts published in each journal. Chi-square tests of homogeneity were used to test the hypothesis that the proportion of abstracts adherent to checklist items was homogeneous across journals.

RESULTS: Mean inter-rater agreement among the three reviewers for checklist items was 84 % in the pre-study run-in. Search results yielded 466 study abstracts (100 from J1, 66 from J2, 100 from J3, 100 from J4, 100 from J5), three of which were later excluded as they were not RCTs. Analysis of all scored items in the 463 abstracts showed an overall adherence of 67 % (95 % CI, 0.66–0.68) to the CONSORT guidelines. Adherence was lowest for descriptions of methods of allocation concealment (8 %, 95 % CI, 0.06–0.10) and random sequence generation (19 %, CI 95 %, 0.15–0.23) and highest for clear interpretations of the trial (99 %, 95 % CI, 0.98–1.00), clear statements of trial objectives (96 %, 95 % CI, 0.94–0.98), and reporting of trial registration data (96 %, 95 % CI, 0.94–0.98). Adherence rates displayed substantial heterogeneity among journals. J3 had the highest overall adherence rate (78 %, 95 % CI, 0.76–0.80) while J1 had the lowest (55 %, 95 % CI, 0.53–0.57).

CONCLUSIONS: Among the five highest-impact general medical journals there is variable and overall suboptimal adherence to CONSORT for Abstract reporting guidelines of randomized trials, with substantial differences between individual journals. Specific areas in need of improvement include reporting of allocation concealment and random sequence generation. Interventions to systematically standardize the reporting of abstracts at the journal manuscript processing level could enhance the reliability and quality of abstract reporting of clinical trial results.

QUALITY OF TOBACCO TREATMENT IN HOSPITALS—SYSTEM-LEVEL AND PATIENT-LEVEL PREDICTORS OF GAPS IN CARE Ellie Grossman¹; Jenny Chen¹; Alissa R. Link²; Binhuan Wang²; Scott Sherman³. ¹NYU School of Medicine, New York, NY; ²New York University, New York, NY; ³VA New York Harbor HCS, New York, NY. (Tracking ID #2199135)

BACKGROUND: Identification and treatment of patients who smoke is a priority for hospitals. Hospitalization may be a key 'teachable moment' for enhancing behavior change, when patients must undergo enforced abstinence from cigarettes and may also be particularly concerned about their health. We aimed to describe care for smokers at two urban safety-net hospitals and determine patient and system characteristics associated with higher-quality care.

METHODS: As part of a randomized controlled trial of post-discharge smoking cessation interventions, we assessed care for smokers at two large hospitals in New York City. Adult patients were eligible for study inclusion if they: smoked at least one puff of a cigarette in the past 30 days; spoke English, Spanish, or Mandarin; were not incarcerated or in police custody; were not pregnant or breastfeeding, and had a U.S. phone number. Study participants provided sociodemographic information via in-person questionnaires administered at enrollment. Study staff reviewed participants' electronic medical records (EMR) for information about type of inpatient unit, history of medical or psychiatric illnesses, and tobacco treatment received. Outcomes of interest were: receipt of bedside counseling, prescription of nicotine replacement therapy (NRT) in hospital and patient acceptance of it, and prescription of NRT on discharge.

RESULTS: We enrolled 1618 participants. Mean age was 48 years (SD 13.4); 35 % were Hispanic, and 69 % were non-white race. Twenty-nine percent had Medicaid, and 17 % were uninsured. Fifty-two percent had a high-school diploma, GED, or less. Twenty-one percent were born outside the United States. Thirty-nine percent were hospitalized on an inpatient psychiatric unit at the time of study enrollment. Seventeen percent had coronary artery disease, and 60 % had an alcohol or substance use disorder documented in the EMR. Study participants smoked an average of 12.4 cigarettes per day, and had smoked for an average of 26.6 years. Eighty-eight percent received some type of counseling to support smoking cessation in the hospital (as documented in the EMR), 44 % were prescribed NRT during hospitalization, and 79 % of participants accepted the NRT more

than half of the days it was prescribed. Eighteen percent of participants were prescribed smoking cessation medication on discharge. Patients on inpatient psychiatric units were more likely to receive bedside counseling (odds ratio (OR) 1.53, 95 % confidence interval (CI) 1.004–2.33). Patients who smoked more cigarettes per day prior to admission (OR 1.05, 95 % CI 1.04–1.06 for each additional cigarette per day), were born in the United States (OR 1.39, 95 % CI 1.02–1.89), were on an inpatient psychiatric unit (OR 2.80, 95 % CI 2.12–3.69), and were at the VA site (OR 1.44, 95 % CI 1.10–1.90) were more likely to be prescribed NRT in hospital. However, patients who had less education, were non-Hispanic white, were on non-psychiatric units, and were at the non-VA site were more likely to accept most of the NRT prescribed. Patients who smoked more cigarettes per day (OR 1.03, 95 % CI 1.02–1.04 for each additional cigarette per day) and were at the VA site (OR 2.76, 95 % CI 1.71–4.45) were more likely to be prescribed NRT on discharge.

CONCLUSIONS: Although rates of bedside counseling (as documented in the EMR) are high, there is significant room for improvement in rates of prescribing NRT in hospital and on discharge—with quality differences between hospitals, between units within hospitals, and between patients. Further study is needed to understand how hospital systems and clinician behavior can be improved to boost quality of care for all patients.

RACIAL AND ETHNIC DIFFERENCES IN HEALTH BEHAVIORS AMONG PREGNANT AND POSTPARTUM WOMEN Ashley M. Harris¹; Nymisha Chilukuri²; Meredith West³; Janice L. Henderson⁴; Shari Lawson⁴; Sarah Polk⁴; David M. Levine¹; Wendy L. Bennett¹. ¹Johns Hopkins Hospital, Baltimore, MD; ²Johns Hopkins University School of Medicine, Baltimore, MD; ³Johns Hopkins School of Medicine, Baltimore, MD; ⁴Johns Hopkins Bayview Medical Center, Baltimore, MD. (Tracking ID #2194807)

BACKGROUND: Obesity is increasingly prevalent among young and minority women, increasing the risk for both pregnancy-related, and chronic metabolic, hypertensive and cardiovascular diseases. Obesity rates vary by race and ethnicity with minority women at highest risk, yet data on racial/ethnic differences in health behaviors is conflicting. Understanding women's health behaviors, as well as perceived barriers and facilitators for positive dietary lifestyle changes, will inform outpatient interventions to target those at highest risk. Our objectives were to assess racial and ethnic differences in health behaviors among a racially diverse group of pregnant and postpartum women.

METHODS: We conducted a cross-sectional study of 247 women who were pregnant or within one year of delivery, of which 212 women were Hispanic (31 %), Black (44 %) or White (25 %). They were recruited from 4 hospital-based outpatient clinics and completed a self-administered survey that assessed health behaviors. Main outcomes were fast food frequency and sugar sweetened beverage intake. Secondary outcomes were the relationship between socioeconomic factors and the outcomes, as well as barriers and facilitators to healthy behaviors. We used multivariate logistic regression analyses to evaluate the association between race/ethnicity and health behaviors, after adjusting for relevant socio-demographic factors. We used descriptive statistics and bivariate analyses to evaluate secondary outcomes. We performed a sensitivity analysis to evaluate the effect of obesity status (BMI <30 vs BMI ≥30) on the relationship between race/ethnicity and fast food frequency.

RESULTS: Black women, when compared with Hispanic and White women, were less likely to be married (52.6 % vs 85.7 and 79.6 %, $p < 0.0001$), and more likely to be under age 30 (80 % vs 63.5 and 42.6 %, $p < 0.0001$), and unemployed (33.7 % vs 20 % and 16.7 %, $p < 0.0001$). Black women (60 %) were more likely than Hispanic (38 %) or White (37 %) women to eat fast food 1 or more times/week ($p = 0.03$). Similarly, Black women (68 %) were more likely to drink one or more cans of sugar sweetened beverages per week than Hispanic (52 %) or White (52 %) women, but the results were not statistically significant ($p = 0.06$). In adjusted analyses, Black women had 2.4 increased odds of fast food intake ≥ once weekly, when compared with White women ($p = 0.03$). Hispanic women were equally likely to eat fast food as White women (OR = 1.10, $p = 0.83$). There were no significant differences in sugar sweetened beverage intake between the racial/ethnic groups. In the sensitivity analysis, there were no significant differences between the racial groups in the BMI ≥30 subgroup. In the subgroup with BMI <30, Black women had 4.7 greater odds of fast food intake one or more times a week, when compared with White women ($p = 0.01$). There were no significant differences between Hispanic and White women (OR = 1.39, $p = 0.36$) in this subgroup. In terms of barriers to healthy eating, 37.6 % of women named family/personal preference as a barrier, followed by access to healthy, affordable foods (25.7 %) time constraints (22.0 %), and knowledge (14.8 %). For facilitators, 34.8 % of women named internet related activities, followed by educational activities such as guided shopping (30.00), group activities such as social support group (18.8) and stress reduction seminar (17.4).

CONCLUSIONS: Pregnant and postpartum Black women have increased odds of fast food intake one or more times per week when compared to White and Hispanic women, with a stronger association in the non-obese subgroup of women. These data suggest that nutritional counseling around fast food should be targeted to all obese women, and to

Black women, regardless of BMI. Despite the lack of significant differences in sugar sweetened beverage consumption by race/ethnicity, intake was high across all 3 groups, suggesting the need for interventions to improve this health behavior among high risk women.

RACIAL AND ETHNIC DISPARITIES IN HEALTHCARE AMONG WOMEN IN THE VA: A SYSTEMATIC REVIEW Andrea Carter¹; Sonya Borrero^{1, 2}; Charles Wessel¹; Bevanne Bean-Mayberry³; Donna L. Washington³; Jennifer Corbelli¹. ¹University of Pittsburgh, Pittsburgh, PA; ²VA Pittsburgh Healthcare System, Pittsburgh, PA; ³VA Greater Los Angeles Healthcare System, Los Angeles, CA. (Tracking ID #2194054)

BACKGROUND: Women, including those from racial and ethnic minority groups, are a rapidly growing segment of patients who seek care in the Veterans Affairs (VA) Healthcare System, yet many questions regarding their health care experiences and outcomes remain unanswered. Numerous studies have documented racial and ethnic disparities in healthcare among male veterans and among non-veteran women, but potential disparities among female veterans have not been systematically studied. We aimed to identify and summarize existing work on racial and ethnic healthcare disparities among female VA users and to identify areas in which research efforts should be focused to address the largest and most important gaps in the literature.

METHODS: We conducted a systematic review of the literature on racial and ethnic disparities in healthcare among female patients in the VA Healthcare System. We selected studies that met the following criteria: 1) were conducted within the VA Healthcare System, 2) reported data on females only, 3) reported data on utilization or quality of health care services, 4) stratified data by patient race or ethnicity, and 5) were published in a peer-reviewed source. A health sciences librarian developed and translated systematic literature searches using Mesh, Emtree, and the American Psychological Association (APA) Thesaurus of Psychological Index Terms. We identified studies by searching PubMed, EMBASE, and APA PsycINFO on June 30, 2014. Our search identified 4065 references. After duplicate citations were removed, 2591 citations were screened, and 2446 citations were eliminated based on title or abstract. The remaining 145 full-text citations were reviewed, 9 of which met the inclusion criteria.

RESULTS: The 9 studies that examined racial and ethnic disparities in health care among female VA users assessed the following healthcare domains: contraception provision/access ($n=3$), treatment of low bone mass ($n=1$), hormone therapy ($n=1$), utilization of mental health or substance abuse related services ($n=2$), trauma exposure and utilization of various VA services ($n=1$), and satisfaction with primary care ($n=1$). Six were retrospective cohort studies, one was a cross-sectional survey, and two were combination cohort and survey studies. Overall, six of nine studies showed evidence of a significant racial or ethnic difference (Table 1).

CONCLUSIONS: In contrast to the wealth of literature examining racial and ethnic healthcare disparities both among male veterans and women in non-VA settings, only nine studies have been published that examine disparities specifically among women in the VA Healthcare System. Many areas of women's health where racial and ethnic disparities have been shown to exist in non-VA settings have not yet been examined within the VA, including obtaining cervical cancer screening, early prenatal care, mammograms, and annual preventive visits[1]. The results of this systematic review demonstrate that there is an unmet need both to further identify and subsequently reduce or eliminate racial and ethnic disparities among female VA-users. Addressing this unmet need will inform our national agenda of eradicating of health disparities. [1] Kaiser Family Foundation. Putting Women's Health Care Disparities on the Map. 2009.

Table 1

First Author Year	Outcome(s)	Evidence of significant racial/ethnic difference?
Kazerooni 2014	No evidence of racial disparity in adherence to hormonal contraception.	No
Borrero 2013	Hispanic women are more likely than Caucasian women to experience gaps between refills of hormonal contraception. Hispanic women and African-American women receive fewer months of contraceptive coverage than Caucasian women.	Yes
Borrero 2012	Hispanic and African American women are less likely than Caucasian women to have documented receipt of any contraception. African American women are more likely than white women to use one of the most effective methods of contraception such as intrauterine device, implant, or surgical sterilization.	Yes

(continued)

Haskell 2008	African American and Hispanic women are more likely than Caucasian women to discontinue hormone therapy.	Yes
Grubaugh 2008	No evidence of racial disparity in manifestation or severity of psychopathology or in use of VA health care services or disability benefits.	No
Bean-Mayberry 2006	No evidence of racial disparity in satisfaction with primary care clinic.	No
Wei 2003	African-American women are less likely than Caucasian women to receive anti-resorptive drugs for treatment of low bone mass.	Yes
Bosworth 2000	No evidence of disparity in obtaining mental health services. African American women want a mental health referral more frequently than Caucasian women.	Yes
Ross 1998	Native American women are more likely than Caucasian women to receive formal alcohol treatment.	No

RACIAL AND ETHNIC DISPARITIES IN MENTAL HEALTH VISITS AND EXPENDITURES FOR CHILDREN AND YOUNG ADULTS: A NATIONAL STUDY Lyndonna M. Marrast²; David Himmelstein^{1, 3}; Steffie Woolhandler^{1, 3}. ¹City University of New York School of Public Health, New York, NY; ²Hofstra North Shore LIJ School of Medicine, Kew Gardens, NY; ³Harvard Medical School, Cambridge, MA. (Tracking ID #2198370)

BACKGROUND: The United States has the world's highest incarceration rate. Blacks and Latinos account for the majority of inmates. A substantial proportion of inmates are mentally ill, and prisons and jails are now the largest mental health institutions in many states. Prior studies have found that minorities have less access to various healthcare services. We assessed racial and ethnic disparities in mental health care for children and young adults, groups at high risk for criminal justice system involvement.

METHODS: We analyzed data from the 2006–2012 Medical Expenditure Panel Survey (MEPS), a nationally representative survey that collects data on healthcare utilization and expenditures. We limited our analysis to white, black, and Latino children under 18, and youths age 18–34. Using t-tests, we compared the mean number of visits to outpatient mental health providers (any visit to a psychiatrist or psychologist, as well as visits to social workers for psychotherapy or mental health counseling). In addition, we examined visits to any outpatient clinician at which (1) psychotherapy/mental health counseling was delivered; (2) “mental health care” was coded as the principal reason for the visit; or (3) substance abuse counseling was delivered. We also analyzed emergency department visits and inpatient admissions for psychiatric diagnoses. Using linear regression we assessed racial and ethnic differences in mental health care utilization controlling for gender, region, poverty level, insurance and mental health status.

RESULTS: Black and Latino children made 39 and 46 % fewer visits to psychiatrists; 67 and 67 % fewer visits to psychologists, and 40 and 80 % fewer visits, respectively, to social workers for mental health care compared to white children ($p<0.05$ for all comparisons). Similarly, comparison of white youth to minorities show that Black and Latino youth made 47 and 65 % fewer visits to psychiatrists; 80 and 80 % fewer visits to psychologists; and 83 and 88 % fewer visits, respectively, to social workers for mental health care ($p<0.05$ for all comparisons). Minority children and youth also had fewer outpatient visits for mental health services to outpatient clinicians overall. Expenditures for mental health-related outpatient care followed similar patterns. For instance, per capita mental health psychiatry expenditures for white children were 62 % higher than for Black children. Analyses controlling for gender, region, poverty level, insurance and mental health status yielded similar results. Findings on substance abuse counseling, emergency department visits and psychiatric hospitalizations showed variable differences.

CONCLUSIONS: Minority children and youth receive markedly less mental health care than their white counterparts. These disparities appear greater than for most other health services, and may be a reflection of institutional racism that contributes to the excess incarceration of minority youth.

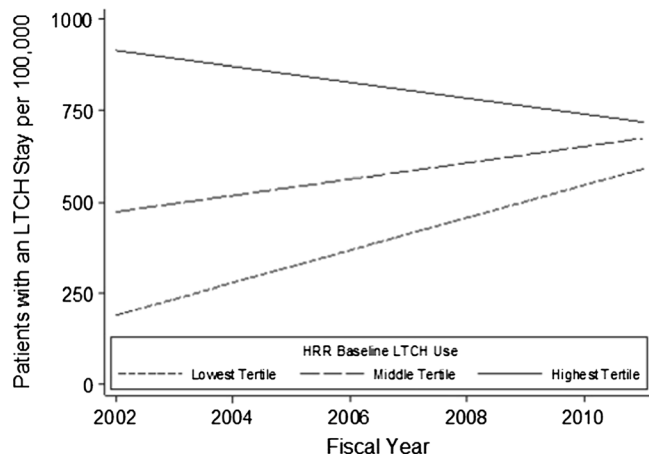
RACIAL DISPARITIES IN PATIENT ACTIVATION: EVALUATING THE MEDIATING ROLE OF HEALTH LITERACY WITH PATH ANALYSES Kendrick B. Gwynn^{1, 5}; Michael Winter²; Howard Cabral²; Michael S. Wolf⁴; Lori Henault⁵; Katie Waite⁵; Timothy Bickmore³; Michael Paasche-Orlow¹. ¹Boston University School of Medicine, Boston, MA; ²Boston University School of Public Health, Boston, MA; ³Northeastern University, Boston, MA; ⁴Northwestern University, Chicago, IL; ⁵Boston Medical Center, Boston, MA. (Tracking ID #2176220)

BACKGROUND: Patient activation, a person's ability to manage his or her own health has been shown to be lower in African Americans than whites. The etiology of this relationship has not been elucidated. As health literacy has been linked both to race and patient activation it may be a mediator of racial disparities in patient activation. The aim of this study was to use path analysis methods to determine if health literacy mediates the relationship between race and patient activation.

METHODS: We performed a secondary analysis of data from a randomized control trial to promote walking in elderly, urban, minority patients using path analysis. Patients with cognitive impairment, depression and high risk of falls were excluded. Patient activation was measured with the Patient Activation Measure. Health literacy was measured with the short Test of Functional Health Literacy in Adults. Path analysis was used to evaluate the mediation of race on patient activation through different variables. Several models were tested for best fit including direct and indirect effects of age, level of education, sex, depression, number of comorbidities for their effects on patient activation.

RESULTS: The 263 participants had a mean age of 71.3; 51 % female; 63 % African American; 51 % high school education or less. Across all models significant mediation paths were identified from African American race to lower patient activation through health literacy. This relationship remained significant throughout alternative model testing for combinations including: education; age; sex; depression; and level of comorbidity. The best-fit model included an indirect effect of sex on patient activation through health literacy indicating that the mediation effect of health literacy on patient activation was most profound for African American males. The relationship between health literacy and patient activation was also significantly related to comorbidities such that health literacy had a bigger influence on patient activation for participants with a higher number of comorbidities than for those with a lower number of comorbidities. No significant direct effect was shown between race and patient activation in any of the models.

CONCLUSIONS: The relationship between African American race and lower patient activation was fully mediated by health literacy. Future interventions to improve race disparities in patient activation need to be targeted at improving health literacy and removing unneeded complexity from health systems.



Model of best fit: Path from race and gender to patient activation goes through health literacy. Significant effects are circled.

RACIAL/ETHNIC DIFFERENCES IN DESTINATION EMERGENCY DEPARTMENTS FOR ACUTE CARE Amresh D. Hanchate^{1, 2}; Michael Paasche-Orlow²; William E. Baker³; Sophia Dyer³; Chen Feng²; James Feldman³. ¹VA Boston Healthcare System, Boston, MA; ²Boston Medical Center/Boston University School of Medicine, Boston, MA; ³Boston University School of Medicine, Boston, MA. (Tracking ID #2197883)

BACKGROUND: Several studies have identified high levels of clustering of minority patients in a small number of hospitals; 5 % of hospitals cared for nearly half of all

admissions for elderly minority patients. Other studies have reported that worse quality of inpatient care for minority patients. Different pathways and factors likely affect "choice" of hospitals. For patients with acute conditions an important pathway is the emergency department (ED) where care is initiated. Do patients of different race/ethnicity residing in the same area arrive at the same ED? Our hypotheses were that, for patients living in the same area, likelihood of admission to a given ED varies by race/ethnicity, and the main destination hospitals for minorities and Whites are likely to differ in quality characteristics.

METHODS: Using comprehensive administrative data from Massachusetts (2010–11), we identified all ED visits among adults 18 or older for selected 26 AHRQ Clinical Classification System (CCS) admission conditions, including non-specific chest pain, AMI, congestive heart failure, asthma, chronic obstructive pulmonary disease, acute cerebrovascular disease, epilepsy and hip fracture. Limiting the study to Massachusetts residents, and using residence zip code as the location indicator, we defined the expected probability of being admitted to a given ED as the proportion of all patients from that zip code admitted to that ED. Under the null hypothesis of similar probability by race/ethnicity, we calculated expected number of ED visits by hospital for each race/ethnic group from each zip code based on total ED visits. Aggregating the patient counts from all zip codes, we then obtained the ratio of observed to expected number of patients (O/E) by race/ethnicity, along with the 95 % confidence interval (CI) using 1000 bootstrap samples. For each minority group, we identified hospitals with observed admissions more than expected (O/E 95 % CI > 1) as minority-serving hospitals. We compared hospital characteristics between minority-serving and non-minority serving hospitals. To examine sensitivity of findings, we performed similar analysis for ED visits that resulted in inpatient admission.

RESULTS: We identified a total of 767,874 visits to 60 EDs in Massachusetts. The top 5 destination EDs accounted for a larger proportion of the ED visits among minorities (45 % for Blacks and 40 % for Hispanics) than for Whites (20 %). Observed number of patients was significantly larger than expected in 7 hospitals for blacks and 17 hospitals for Hispanics. Seventy-three percent of the 7 black-serving hospitals and 53 % of the 17 Hispanic-serving hospitals were safety net hospitals, compared to 20 % safety net hospitals overall. A similar pattern was found for the subset of ED visits that led to inpatient admission; 4 and 5 hospitals, respectively, were identified as black-serving and Hispanic-serving. Minority-serving hospitals were more likely to be teaching hospitals with larger bed size capacity and admission volume.

CONCLUSIONS: For patients living in the same zip code, we found that the destination EDs for Black and Hispanic patients differed from that for White patients. Future studies need to examine if such differences can be explained by differences in transportation time, clinical condition, or patient preference, or lead to differential patient outcomes.

RANDOMIZED CONTROLLED EVALUATION OF AN INTENSIVE MANAGEMENT PATIENT ALIGNED CARE TEAM (IMPACT) FOR HIGH-NEED, HIGH-COST VETERANS AFFAIRS PATIENTS Donna M. Zulman^{1, 2}; Christine Pal Chee^{2, 2}; Stephen C. Ezeji-Okoye³; Jonathan G. Shaw^{1, 3}; James S. Kahn^{3, 1}; Steven Asch^{1, 2}. ¹Stanford University, Stanford, CA; ²VA Palo Alto, Menlo Park, CA; ³VA Palo Alto, Palo Alto, CA. (Tracking ID #2198452)

BACKGROUND: Healthcare systems are increasingly adopting intensive management primary care interventions to optimize care and contain costs for high-need, high-cost (HNHC) patients. Few of these programs, however, have been studied in randomized controlled trials, raising concern that observed decreased costs are driven by regression to the mean rather than by the programs themselves. An intensive management quality improvement intervention was offered to a random sample of Veterans Affairs (VA) HNHC patients, providing an opportunity for a rigorous controlled study.

METHODS: In 2013, the Palo Alto VA launched a quality improvement program for HNHC patients to augment the VA's patient centered medical home (Patient Aligned Care Team, or PACT) with Intensive management (ImPACT). ImPACT's multidisciplinary team offered patients enhanced access, chronic disease management, support during health deteriorations, and social work and recreation therapy. Patients were eligible for ImPACT if their VA health care costs or risk for hospitalization were in the top 5 % for the facility, they were outpatients for over half of the eligibility period, and they were not enrolled in another VA intensive management program. Among 583 eligible patients, 150 randomly selected individuals were invited to enroll in ImPACT; the remaining ImPACT-eligible patients received standard PACT care and served as a control group. We evaluated changes in total health care costs (including intervention costs), hospital admissions, and emergency department visits among ImPACT and PACT patients, excluding those who died or moved away before the intervention began ($n=38$), across a 16-month baseline and 17-month follow-up period. We performed an intention-to-treat analysis within a difference-in-differences framework. In secondary analyses, we estimated the effect of the intervention on patients who actively participated in ImPACT using randomization as an instrument for participation. We also conducted stratified analyses to examine the influence of age, comorbid mental health and medical conditions, and baseline risk for

hospitalization. We assessed changes in satisfaction with VA care using ImPACT patients' responses to the Patient Satisfaction Questionnaire at baseline and 6 months after enrollment.

RESULTS: Two-thirds of invited patients ($n=101$) enrolled in ImPACT, 87 % of whom remained actively engaged at 9 months. In intention-to-treat analyses, changes in average monthly costs between the baseline and follow-up periods did not differ significantly between ImPACT and PACT patients. Modest, but non-statistically significant, greater cost reductions were observed for certain subpopulations in ImPACT (Table). Rates of medical/surgical hospitalizations and emergency department visits declined at similar rates in both groups. Secondary analyses accounting for patient participation revealed similar, non-statistically significant, patterns for cost and utilization. Among 48 ImPACT patients who responded to baseline and follow-up surveys (55 % response rate among engaged participants), there were significant increases in general satisfaction with VA care ($p<0.05$) and satisfaction with communication ($p<0.05$).

CONCLUSIONS: Intensive management for HNHC individuals did not achieve greater reductions in costs or acute care utilization compared with standard patient-centered medical home care but resulted in significant improvements in patient satisfaction among participants. Given the rapid spread of these models, understanding organizational context is important. Settings with existing medical homes and population-based management strategies may not achieve cost benefits.

Change in average monthly costs among ImPACT patients, relative to ImPACT-eligible patients receiving standard care

	n	Mean	Standard Error
All Patients	545	-101	(614)
Heart Failure, Diabetes, or COPD diagnosis	306	-754	(763)
No mental health diagnosis	165	-246	(1184)
Age under 65 years	276	-922	(998)
Hospitalized in 6 months pre-enrollment	197	-198	(1315)
High-risk and hospitalized in 6 months pre-enrollment	171	-657	(1343)

RANDOMIZED CONTROLLED TRIAL OF A DECISION AID WITH TAILORED FRACTURE RISK TOOL DELIVERED VIA A PATIENT PORTAL Joan Neuner¹; Marilyn M. Schapira²; Alicia J. Smallwood¹. ¹Medical College of Wisconsin, Milwaukee, WI; ²University of Pennsylvania, Philadelphia, PA. (Tracking ID #2200195)

BACKGROUND: Decision aids have been shown to improve a number of measures of shared-decision making, but are rarely implemented in routine primary care practice. We aimed to adapt and evaluate a tailored fracture prevention decision aid, delivered via a patient portal for "just in time" use with bone mineral density test results.

METHODS: The decision aid (DA) was adapted from an earlier AHRQ decision aid using international IPDAS standards. It included general information about osteoporosis, a personalized risk estimate based on the FRAX model, summary of medication risks and benefits (prescription and nonprescription) and an elicitation of values. The DA was iteratively pilot tested by seven patients for completeness and usability within a portal. Primary care internal medicine and family medicine patients in three clinics affiliated with a large academic center (aged ≥ 55 , spoke and read English fluently and without evidence of dementia) who were enrolled in an institutional PHR (Epic's MyChart), had completed a bone mineral density exam (BMD), and were diagnosed with osteoporosis or osteopenia were offered participation in the study. After internet-based consent, eligible patients were randomized to receive the decision aid or a link to a general aging website; telephone-based help from a research assistant was available if needed. Results of the decision aid were made available to primary care internal medicine and family medicine physicians. Patient outcome measures included pre- and post-decision aid 10-item decisional conflict scale (DCS, 0-100, lower scores=less conflict), 10 knowledge questions and 10 questions examining the usefulness of the DA. The same outcome measures, along with questions about the DA's influence upon discussions with the patient's PCP, were also measured at 3 months; 44 % of the sample has completed that study phase. Physicians were also asked if reviewing bone density test information affected the length of any followup visit with the patient and if the decision aid had any effect on their team's workload.

RESULTS: Fifty patients of 18 PCPs had a median age of 79 years; 96 % were Non-Hispanic white; 86 % had attended at least some college. Patients randomized to the decision aid were more likely to report that they had made a decision (65%vs. 36 %, $p<.01$), had a greater increase in knowledge, $p=0.015$, and a greater reduction in overall decisional conflict (29.7 vs 8.0, $p=.002$). Decisional conflict subscale results were similar (table). All patients who received the decision aid were able to negotiate their computer

and the decision aid website, but required help understanding their BMD test results in order to use the FRAX-based personalized risk calculator. Among patients who received the decision aid, 52 % reported (on a 5-point scale) that the DA prepared them to make a better decision "quite a bit" or "a great deal" 79 % reported that the DA helped them think about how involved they want to be in this decision "quite a bit" or "a great deal", and 69 % reported that the DA helped prepare them for their follow-up visit with their doctor. Among patients who have completed 3-month follow-up, most reported not having met with their doctor regarding their BMD test and thus had not had the opportunity to talk about whether/how their bone density test and decision aid results influenced recommendations about fracture reduction strategies. Most of the physicians also reported not having seen the patient at the time of the three month follow-up survey; they did not report any effect of the decision aid on out-of-office workload.(eg additional emails via the portal).

CONCLUSIONS: A fracture reduction decision aid for patients through a patient portal improved knowledge and key measures of quality of decision-making. Patients were generally successful at using their computer and the internet to negotiate the DA, but required help completing FRAX-based risk calculator, and often did not see physicians back to discuss results. Patient portals may offer an important opportunity to engage patients, but future research should investigate how best to incorporate DAs into care workflows to maximize shared decision-making.

Decisional Conflict Subscale results*

Decisional Conflict Subscale	Experimental (N=29)			Control (N=21)			p value for difference in Δ
	Before DA	After DA	Δ	Before DA	After DA	Δ	
Uncertainty	63.79	31.03	32.76	66.07	59.52	6.55	.008
Informed	50.57	15.52	35.06	65.87	56.35	9.52	.011
Values	56.03	12.07	43.97	64.29	51.19	13.10	.001
Clarity							
Support	27.59	14.94	12.64	30.95	26.98	3.97	.071

*All 0-100, Lower score indicates greater certainty, better informed, clearer values, and greater support

RATES OF HEPATITIS A AND HEPATITIS B VACCINATION IN AN URBAN, PRIMARY CARE-BASED HEPATITIS C CLINIC Michelle P. Clermont²; Sangeetha Dayalan³; Shelly-Ann Fluker²; Lesley Miller¹. ¹Emory University, Atlanta, GA; ²Emory University School of Medicine, Atlanta, GA; ³WellStar Cobb Medical Group, Austell, GA. (Tracking ID #2196390)

BACKGROUND: Patients with hepatitis C who become infected with hepatitis A or B are at risk of accelerated progression to cirrhosis and fulminant hepatic failure. Thus, vaccination against hepatitis A and B for all susceptible hepatitis C patients is recommended. However, studies have shown that rates of vaccination remain low, especially in the primary care setting. The Liver Clinic at Grady Memorial Hospital is a primary-care based clinic that provides comprehensive care for underserved patients with hepatitis C. Rates of hepatitis A and B vaccination in the Liver Clinic were previously found to be comparable to other specialty clinics, but vaccination was not universal. We were interested in seeing whether vaccination rates would be higher in a cohort of Liver Clinic patients treated with a protease inhibitor-based antiviral regimen.

METHODS: A retrospective chart review was performed on 42 consenting patients with chronic hepatitis C treated with telaprevir or boceprevir between 2011 and 2013. Data were abstracted on frequency of serologic testing for hepatitis A and B, hepatitis A and B immunity status, and vaccination receipt. Hepatitis A immunity was defined as a positive hepatitis A total antibody. Hepatitis B immunity was defined as the presence of either a positive hepatitis B core antibody or a positive hepatitis B surface antibody.

RESULTS: Immunity status to hepatitis A and B was checked in 100 % of patients. Forty-eight percent of patients were potentially susceptible to hepatitis A, and 74 % of patients were potentially susceptible to hepatitis B. The rate of documented, completed vaccination for hepatitis A among those susceptible was 55 % and for hepatitis B was also 55 %. Of note, an additional 12 % of patients received partial hepatitis A vaccination but did not complete the series and an additional 17 % of patients received partial hepatitis B vaccination without completing the series.

CONCLUSIONS: The rates of vaccination for hepatitis A and B in patients with chronic hepatitis C on antiviral therapy in our primary care-based hepatitis C clinic were significantly higher than reported for primary care practices, and comparable to some specialty

practices. Reasons for sub-optimal vaccination rates are multi-factorial and include lack of time, failure on the part of the physician to remember to inquire about or order the vaccinations, unknown immunity status, patients' fears or misconceptions about vaccination and failure on the part of the patient to follow up to complete a vaccination series. Solutions addressing each of these will be necessary to improve vaccination rates in the future. Potential solutions include use of electronic medical record for tracking vaccination status, improving physician training to counsel patients, and creating patient registries for more accurate patient vaccination schedules.

RATIONALE, FACILITATORS, AND BARRIERS TO COLORECTAL CANCER SCREENING AMONG A RACIAL AND ETHNIC DIVERSE POPULATION

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BACKGROUND: Colorectal cancer (CRC) remains a leading cause of death in the United States; yet screening rates remain suboptimal, particularly in socioeconomically disadvantaged and racial/ethnic minority groups. Previous studies often have assessed barriers to CRC screening, but facilitators to screening are less well explored. Furthermore, more exploration is needed in a longitudinal setting regarding such barriers to and facilitators of CRC screening. Our objective is to describe rationale, facilitators and barriers to CRC screening (stool card and colonoscopy) reported by a population of average risk, 50–75 year-old, racial/ethnic minority patients 6 months following a non-acute general internal medicine visit.

METHODS: Data were extracted from a larger study designed to promote CRC screening among racial/ethnic minority patients at seven federally qualified health centers and one academic health center in a large, urban area (Chicago, Illinois). English and Spanish-speaking patients ages 50–75 years who had participated in a trial designed to increase screening recommendation and completion for CRC participated in an interviewer-administered telephone survey 6 months after their clinic visit. Qualitative responses about barriers and facilitators to screening and future screening intentions were analyzed by content and constant comparative analysis. Responses to open-ended questions were unitized, generally delineated by conjunctions or punctuation. Based on a preliminary review of the unitized responses, coders developed a set of mutually exclusive and exhaustive categories. Responses were double-coded; disagreements were resolved by discussion.

RESULTS: Among 538 eligible patients, 239 patients completed an interviewer-administered survey 6 months after their physician visit (response rate: 44.4 %). The mean age was 58.2 years (SD=6.4); 77.8 % were female; 43.7 % identified themselves as Hispanic/Latino, and 54.0 % as Non-Hispanic Black; 29.7 % reported 0–6 years of education, 45.6 % reported 7–12 years of education and 23.8 % had 13 or more years of education. Almost one-third of patients (29.3 %) reported being uninsured. At 6 months post-clinic visit, self-reported screening rates for colonoscopy within the past 6 months were 14.6 %, 7.1 % for stool tests (FOBT and FIT), and 2.1 % reported an unspecified CRC screening. Primary reasons for undergoing a colonoscopy included: physician recommendation, desire for wellness/health, desire for reassurance, and perceived susceptibility due to age. Additional reasons identified by participants completing stool tests included that they could not afford a colonoscopy and/or perceived stool tests as less invasive. Few participants screened by either colonoscopy or stool tests were able to identify any specific facilitators to completion, those who did identified their own desire for reassurance, and physician recommendations as the primary facilitators. Participants screened via colonoscopy identified barriers related to the preparation, challenges with scheduling and general fear, although overall few barriers were expressed. Participants who reported completing stool tests also identified a lack of barriers to screening. Barriers to colonoscopy among those unscreened included fear, missing appointments, medical comorbidities, competing family priorities, and lack of insurance and/or time; barriers to completing stool tests included lack of time and forgetting to return the test. Of the participants who remained unscreened, 65.4 % reported intending to complete CRC screening within the next year. Their rationale for screening completion was similar to that identified among those who had completed screening. A novel barrier identified among participants reporting no intention to complete CRC screening was that of embarrassment; other reasons identified as impeding completion were similar to the barriers previously identified.

CONCLUSIONS: Barriers identified among our participants are similar to those reported in other studies, suggesting the continued need for healthcare providers and systems to address issues such as fear, and stressing the importance of CRC screening in cancer prevention, even when faced with competing priorities and medical comorbidities. Of interest is that even among those participants who had completed screening, few were able

to express any specific patient facilitators. Therefore, in addition to ensuring barriers to screening are consistently addressed at patient, provider and system levels, implementing and communicating the presence of facilitators (e.g., patient navigators, transportation services, appointment reminders), is crucial to increasing CRC screening completion among this population.

REDESIGNING RESIDENT CONTINUITY CLINIC: RESULTS OF A PRE-INTERVENTION SURVEY Rachel Jantea; Raquel Buranosky; Deborah M. Simak; David M. Elnicki. University of Pittsburgh School of Medicine, Pittsburgh, PA. (Tracking ID #2198477)

BACKGROUND: Continuity clinic is a longitudinal patient experience for internal medicine residents required by the Accreditation Council for Graduate Medical Education. Traditionally, residents spend 1/2 day per week in continuity clinic, regardless of clinical rotation. Because residents must perform their usual inpatient rotation duties in addition to clinic, they may spend clinic time on inpatient responsibilities or vice versa. This may inadvertently blunt the educational value of continuity clinic or create a resentful view of ambulatory medicine. Because alternative continuity clinic models exist, we conducted a needs assessment of our current traditional model.

METHODS: Electronic surveys were distributed to residents and preceptors at 3 clinic sites in an internal medicine residency program in June 2014. Survey items were open-ended questions and 5 point Likert scale responses to statements about continuity clinic. Some questions were specific to residents or preceptors; most were asked of both groups. Responses to questions asked of both groups were compared with t-tests. Open-ended responses underwent thematic analysis.

RESULTS: Sixty-four percent of residents and 71 % of preceptors responded. Residents reported being distracted by inpatient issues in clinic, estimating on average 16.7 % of clinic time was spent on inpatient issues. Preceptors agreed with this, but to a significantly higher degree (3.59 vs. 4.27, $p=0.004$). Only a minority of residents felt they had sufficient time in clinic to prepare for appointments (38 % residents) and address their patients' problems (32 % residents). Residents and preceptors agreed there was sufficient time for educational conferences during clinic, but to different degrees (3.33 vs. 3.85, $p=0.029$). Residents felt they spent enough time in clinic to be available for appointments, while preceptors disagreed to a significant degree (3.60 vs. 2.85, $p<0.001$). Residents and preceptors agreed residents saw an adequate number of patients overall, but to different degrees (3.90 vs. 3.27, $p=0.003$). Residents reported their patient continuity was excellent, but estimated continuity with only 50 % of their patients. Residents were generally pleased with their clinic experience, rating it 75/100 (100 was ideal), and anticipated spending approximately 50 % of their future practices in outpatient settings, regardless of specialization. On thematic analysis, areas of resident dissatisfaction were time constraints and inpatient distractions while in clinic, poor patient continuity, and insufficient ambulatory exposure.

CONCLUSIONS: While residents are generally pleased with their continuity clinic experiences, these results revealed several areas for improvement. Residents and preceptors agree that residents are distracted by inpatient issues during clinic. Residents spend substantial clinic time performing inpatient responsibilities, which may explain why they perceive insufficient time for clinic duties and educational conferences. Residents believe they spend enough time in clinic to be available for appointments and report excellent continuity, while preceptors generally disagree. This may suggest a difference in clinical practice expectations with important implications, since residents anticipate half their future practices will be ambulatory. Based on these results, we converted to a 50/50 continuity clinic model, where residents alternate between inpatient and outpatient/elective rotations. In this model, residents attend clinic one full day per week during outpatient months only. We hoped this would minimize inpatient distractions during clinic.

REGIONAL TRENDS IN LONG-TERM ACUTE CARE HOSPITAL USE IN TEXAS Anil N. Makam¹; Ethan Halm²; Oanh K. Nguyen²; Jie Zhou³; Yong-Fang Kuo³; Timothy A. Reistetter³; Kenneth J. Ottenbacher³; James S. Goodwin³. ¹UT Southwestern, Dallas, TX; ²UT Southwestern Medical Center, Dallas, TX; ³University of Texas Medical Branch at Galveston, Galveston, TX. (Tracking ID #2196305)

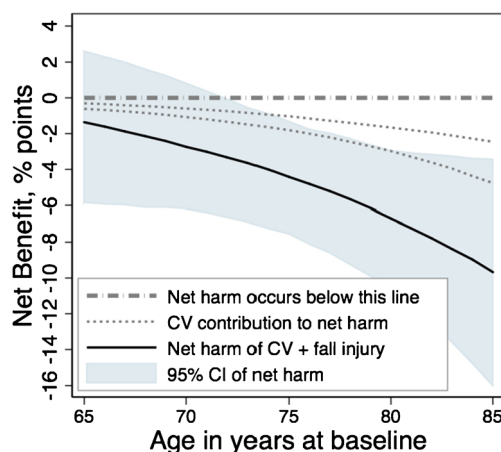
BACKGROUND: There is significant regional variation in the use of long-term acute care hospitals (LTCH), even within states such as Texas that have a relatively abundant supply. We sought to assess whether increased LTCH use is occurring in regions that already have a relatively high use to begin with, suggesting that further increases may result in potentially inappropriate use among individuals with lower acuity of illness who may be better served in alternative post-acute care sites.

METHODS: We evaluated trends of LTCH utilization by the hospital referral regions (HRR) among Texas beneficiaries with continuous enrollment in Medicare Parts A and B from 2002 to 2011 using 100 % Texas Medicare data. Analyses for 23 HRRs were stratified by tertiles of baseline LTCH use (lowest, middle, and highest). We estimated the interaction terms between year and tertile of baseline LTCH use in 2002 using linear regression, accounting for clustering of data by HRR. Utilization is reported per 100,000 Medicare beneficiaries.

RESULTS: Overall, LTCH utilization increased in Texas from 689 patients per 100,000 beneficiaries in 2002 to 782 patients in 2011. From 2002 to 2011, HRRs in the lowest tertile of baseline LTCH use had increased LTCH utilization by 211 % from 190 patients to 591 patients and HRRs in the middle tertile had increased LTCH utilization by 43 % from 473 patients to 675 patients; whereas HRRs in the highest tertile had decreased LTCH utilization by 21 % from 915 patients to 719 patients ($p < 0.001$; **Figure**). The absolute difference between the trends of the lowest and highest HRR tertiles during the 9-year period was 597 patients per 100,000 beneficiaries (95 % CI, 289 to 904, $p < .001$).

CONCLUSIONS: LTCH utilization has increased in the HRRs in Texas with the least utilization at baseline, suggesting that the increased use of LTCHs may be appropriate to care for an aging population recovering from prolonged and/or critical illnesses. Additional work examining trends and patterns in demographic and clinical characteristics of the patients with an LTCH hospitalization is needed.

Fig 2: Net harm of overtreatment



REGIONAL VARIATION IN HOME HEALTH CARE REFERRALS AT HOSPITAL DISCHARGE: RESULTS FROM THE 2012 NATIONAL INPATIENT SAMPLE Christine D. Jones²; Heidi Wald³; Rebecca S. Boxer³; Frederick A. Masoudi³; Robert E. Burke¹; Roberta Capp³; Adit A. Ginde³. ¹Denver VA Medical Center, Denver, CO; ²University of Colorado, Denver, Aurora, CO; ³University of Colorado, Denver, CO. (Tracking ID #2197874)

BACKGROUND: Referrals to home health care (HHC) at hospital discharge increased by 61 % between 2001 and 12. The contributing factors to this rapid growth are unknown. We sought to describe patient- and hospital-level factors associated with home health care (HHC) referrals at hospital discharge.

METHODS: Cross-sectional, retrospective cohort analysis of hospital discharges contained in the 2012 National Inpatient Sample (NIS). The NIS is a weighted, nationally-representative sample of inpatient discharges in the U.S. We included all non-elective admissions for adults 18 years of age or older who survived hospitalization and were discharged to home; we excluded discharges for maternal/neonatal and psychiatric diagnoses. Our primary outcome was HHC referral at discharge, which was compared to discharges home without a HHC referral. We evaluated regional variation using the census division for the discharging hospital. We used logistic regression to evaluate patient- and hospital-level factors associated with HHC referrals and included all statistically significant variables from bivariate analyses. The All Patient Refined Diagnosis Related Group (APR-DRG) Severity of Illness measure was used to measure loss of function. The APR-DRG incorporates both primary and secondary diagnoses, age, procedures, and considers combinations of factors in assigning 5 categories ranging from minor to extreme loss of function.

RESULTS: Five hundred twenty-six thousand three hundred thirty-three hospitalizations ended with a referral for HHC at the time of discharge (18.2 % of 2.9 million total hospitalizations in 2012). Patients with hospitalizations ending in a HHC referral were older (69.9 vs. 57.6 years), women (58.7 vs. 52.8 %), white (72.1 vs. 66.7 %), Medicare beneficiaries (72.8 vs. 44.1 %), had extreme loss of function (9.7 vs. 3.0 %), and had more chronic conditions (6.9 versus 5.0 conditions; p values for all comparisons < 0.05). HHC referrals at discharge were more likely to occur in certain census divisions, including New England (7.4 % HHC referral vs. 4.2 % without HHC referral) and Middle Atlantic (18.1 vs. 14.6 %) divisions (p value < 0.05 for both comparisons). The top 3 primary diagnoses (by AHRQ Clinical Classifications Software codes) associated with HHC referral were Heart Failure (7 % of HHC discharges), Sepsis (6.3 %), and Pneumonia (4.8 %); the top 5 associated with no HHC referral were Cardiac Dysrhythmia (3.9 % of non-HHC discharges), Pneumonia (3.9 %), and COPD/Bronchiectasis (3.4 %). In multivariable logistic regression, HHC referrals for discharged patients were more likely in: older patients (OR 1.41 for each 10 year increase in age, 95 % CI 1.40–1.42); women (OR 1.24, 95 % CI 1.23–1.25); APR-DRG moderate loss of function (OR 1.54, 95 % CI 1.52–1.57), major loss of function (OR 2.39, 95 % CI 2.23–2.44), or extreme loss of function (OR 3.29, 95 % CI 3.18–3.39), compared to no loss of function; patients with comorbid metastatic cancer (OR 1.78, 95 % CI 1.74–1.83); and in census divisions including New England (OR 2.52, 95 % CI 2.20–2.89), Middle Atlantic (OR 1.62, 95 % CI 1.48–1.78), South Atlantic (OR 1.30, 95 % CI 1.20–1.41), and East North Central (OR 1.27, 95 % CI 1.17–1.39) compared to the Pacific division (referent). HHC referrals were less likely in patient discharges with: a primary payer listed as self pay (OR 0.30, 95 % CI 0.28–0.32), no charge (OR 0.31, 95 % CI 0.26–0.37), private (OR 0.75, 95 % CI 0.73–0.76), or Medicaid (OR 0.79, 95 % CI 0.77–0.81) compared to Medicare; and patient addresses in rural counties were less likely to receive a referral compared to central (i.e. urban) counties (OR 0.81, 95 % CI 0.76–0.86). We found similar results in a sensitivity analysis performed only among patient discharges with Medicare insurance.

CONCLUSIONS: Nearly 1 in 5 patient discharges to home are referred for HHC services. Although several factors associated with HHC referrals might be expected, surprisingly large regional variation of HHC referrals by census division was present even after adjusting for demographics and co-morbidities. It is unclear if regional variability in HHC referrals reflects a higher prevalence of functionally impaired, older adults in areas such as New England or if other characteristics, including penetrance of HHC agencies and region-specific differences in provider decision-making about HHC referrals at discharge might also be important. Further evaluation of factors that contribute to regional HHC referral variability should be completed given the rapid growth of HHC referrals at hospital discharge.

REINTEGRATION OF VETERANS AFTER DEPLOYMENT-RELATED MILD TRAUMATIC BRAIN INJURY Edward C. Shadiack²; Drew Helmer^{2, 3}; David P. Graham¹. ¹Michael E. DeBakey VAMC, Houston, TX; ²VA-NJHCS, East Orange, NJ; ³Rutgers University - New Jersey Medical School, Newark, NJ. (Tracking ID #2180940)

BACKGROUND: Veterans of wars in Iraq and Afghanistan returned home after their deployments and experienced challenges reintegrating in civilian social and civic activities. Difficulty with reintegration has been attributed to mild traumatic brain injury (mTBI), experienced by approximately 15 % of these Veterans. We evaluated the association between mTBI and reintegration using the Community Reintegration of Injured Service Members (CRIS) instrument. The CRIS instrument assesses participation as conceptualized in the World Health Organization International Classification of Functioning, Disability and Health and was developed for use with veterans. We hypothesized that mTBI will be independently associated with the extent of participation as measured by the CRIS.

METHODS: This was a retrospective analysis of 93 Veterans who completed a detailed TBI evaluation and full CRIS instrument. Other domains (instruments) evaluated included: alcohol use (AUDIT), pain (BPI), depression (CES-D), environmental barriers to function (CHIEF), and testing effort (WMT). The Neurobehavioral Symptom Inventory (NSI) detected clusters of affective, somato-sensory, and cognitive symptoms. Primary analyses included evaluation of bivariate associations between possibly confounding factors and CRIS subscales of Extent of Participation, Perceived Limitations in Participation, and Satisfaction with Participation. Three hierarchical linear regressions were evaluated, with each CRIS subscale score as the dependent variables. Each hierarchical linear regression involved three steps: entering demographics, then comorbid conditions and finally mTBI status. Secondary hierarchical linear regression analyses evaluated the NSI symptom cluster scores to explore a symptom-based approach to the relationship between mTBI symptoms and reintegration. Demographics were entered in step 1, the three NSI symptom clusters in step 2, mTBI status in step 3.

RESULTS: The mTBI and non-TBI groups did not differ regarding age, ethnicity, marital status, years of education, or number of deployments (all $p > 0.05$), although the mTBI group had higher comorbidity and symptom ratings than the non-TBI group. For the

primary analyses of comorbid conditions, TBI did not independently contribute additional explanatory information. However, lower Extent of Participation was associated with greater depression, alcohol use, and pain interference ratings. Results were similar for Perceived Limitations and Satisfaction ratings. Secondary analyses of symptoms also demonstrated that mTBI had no additional explanatory information. The NSI Affective Cluster was the sole significant predictor for Extent of Participation. Results were similar for Perceived Limitations and Satisfaction.

CONCLUSIONS: While mTBI is associated with reintegration as measured by the CRIS, this relationship disappears after controlling for comorbid conditions, such as depression and chronic pain. Similarly, when controlling for affective symptoms, an independent effect of mTBI disappears. These findings imply that a historical report of mTBI, in and of itself, does not significantly affect extent of community reintegration as measured by the CRIS instrument. Instead, affective symptoms and pain do. mTBI may serve as a marker for greater likelihood, and need for evaluation of, depression, affective symptoms, and pain.

CRIS—Extent of Participation Subscale—Primary Analysis

Variable	Beta(Standardized)	Standard Error	p-Value
PCL-C Total Score	-0.043	0.009	0.812
CES-D Total Score	-0.544	0.009	<0.001
AUDIT Total Score	-0.148	0.010	0.044
BPI - Interference	-0.605	0.53	<0.001
BPI - Severity	0.273	0.058	0.045
CHIEF Total Score	0.090	0.096	0.303
mTBI versus Non-TBI	-0.058	0.217	0.565

Controlling for age, gender, ethnicity, marital status, years of education, military branch, number of deployments and WMT performance.

CRIS- Extent of Participation Subscale - Secondary Analysis

Variable	Beta(Standardized)	Standard Error	p-Value
NSI Affective	-0.484	0.017	0.001
NSI Cognitive	-0.120	0.031	0.429
NSI Somato-sensory	-0.257	0.016	0.075
mTBI versus Non-TBI	-0.005	0.212	0.959

Controlling for age, gender, ethnicity, marital status, years of education, military branch, number of deployments and WMT performance.

RELATIONSHIP BETWEEN NUMBER OF OUTPATIENTS WITH DIARRHEA AND LOCAL NOROVIRUS OUTBREAK Yuichi Takahashi; Naoto Matsuda; Akihiro Inui; Tomohiro Hosoda; Hiromizu Takahashi; Fujiko Morita; Kazutoshi Fujibayashi; Hirohide Yokokawa; Yuki Uehara; Toshio Naito. Juntendo University School of Medicine, Bunkyo, Japan. (Tracking ID #2199911)

BACKGROUND: Norovirus infection is one of the most important infectious disease and occasionally fatal in the infection of infants and the elderly. Every year, high incidence of norovirus infection has been observed in Japan, and each prefecture report the norovirus incidence. However, there are no reports for the smaller city or town level, and we do not have any method for detecting local epidemic of norovirus infection. For primary care setting, local factors to diagnose norovirus are required. If locally centered hospital can provide the alert for local clinics, the information must be useful for regional primary care provider. The aim of the present study was to develop a simple method for detection of local norovirus outbreak.

METHODS: This cross-sectional study was conducted at the Department of General Medicine Juntendo University School of Medicine, Tokyo from November 1st 2013 to March 31st 2014. Participants were outpatients with diarrhea who were agreed to participate in this study and who could perform norovirus test at our center during the mentioned period above. Norovirus positive results were determined if one of RT-PCR or immunochromatography (IC) test showed positive result. RT-PCR and IC test was performed according to the manufacture instruction. Number of patients with diarrhea and number of norovirus-positive patients were evaluated every 2 weeks. "Epidemic" was defined based on the alert of Survey of infectious gastroenteritis by Tokyo Metropolitan Infectious Diseases Surveillance Center Receiver operating characteristic (ROC) curve analysis was performed to determine the optimal cutoff values of numbers of outpatients with diarrhea for detecting the local norovirus outbreak.

RESULTS: Ninety-seven diarrheal outpatients were analyzed during the period. The maximum number of diarrheal outpatient in 2 weeks was 18 in a period of 1st to 15th December 2013. Maximum prevalence of norovirus was 88 %. More than 75 % prevalence of norovirus was shown from the 1st December 2013 to the 31st January 2014. The

optimal numbers of patients cutoff values derived from the ROC analysis was 15 patients during 2 week. The sensitivity and specificity under these cutoff values were 75 and 100 % respectively. The areas under the ROC curve (AUC) for local norovirus outbreak was 0.95. ($p < 0.01$)

CONCLUSIONS: Our study suggested that the epidemic of norovirus infection was inferred from the number of diarrheal outpatients at our hospital. More than 15 patients in 2 weeks might be a simple indicator of local norovirus outbreak. Counting outpatients with diarrhea was useful to predict a local norovirus outbreak of norovirus and may have a potential to contribute for prevention of infection in the community.

RELAXATION RESPONSE AND RESILIENCY TRAINING AND ITS EFFECT ON RESOURCE UTILIZATION James Stahl; John W. Denninger; Darshan H. Mehta; Roberta Goldman; Herbert Benson. Massachusetts General Hospital, Swampscott, MA. (Tracking ID #2195783)

BACKGROUND: A lack of psychological and physical resilience in response to stress drives a great deal of health care utilization. Health care expenditures on mental health disorders were estimated at over \$80 billion/year and were the third largest source of healthcare expenditures after heart disease and cancer; each of which have their own stress burden. Stress influences physiology and the course of disease. Its successful management is part of wellness for the individual and may help us better manage our healthcare resources. The objective of this study was to estimate the consequences on healthcare utilization of mind-body training, specifically, the Relaxation Response and Resiliency program (3RP).

METHODS: A retrospective database analysis was conducted exploring the resource utilization of all patients receiving 3RP through the MGH Benson-Henry Institute from 1/12/2006 to 7/1/2014. In the analysis, we compared resource utilization during the year prior to the 3RP to the year following the training. Patients' resource utilization was captured using the Research Patient Data Registry, a centralized data warehouse comprising all administrative and clinical databases for the Partners Healthcare System. The control group was comprised of patients matched to the intervention group by age, ethnicity, and gender and was three times the size of the intervention group. The intervention, 3RP, is an integrated program of meditation, cognitive behavioral therapy, yoga tools focused on developing skills to promote the voluntary application of the relaxation response and the mitigation of triggers for the stress response. Both study arms were further stratified by the encounter type: clinical, imaging, laboratory and procedural as well as by class of the chief complaint: e.g., Cardiovascular, Musculoskeletal, and Neurologic. Standard statistical methods were used including t-test, ANOVA and regression where appropriate. JMP 11 (SAS product) was used for the statistical analysis.

RESULTS: At one year follow up for the 3RP group ($n=4455$), total utilization decreased by a relative reduction of 61 % [53.46 to 30.47 billable encounters/year (be/yr)] ($p < .0001$) though still remained almost 2 times as high as the control group (15.32 be/yr). Clinical encounters decreased by 59 % [39.96 to 23.21 be/yr] ($p < .0001$), imaging and lab encounters by 66 % [11.52 to 5.72 be/yr] ($p < .0001$), procedures by 41 % [2.15 to 1.69 be/yr] ($p < .006$). Reductions by clinical category were greatest for patients with renal chief complaints, 91 % [199.91 to 16.29 be/yr] ($p = .06$), and least for endocrinologic complaints, 47 % [32.48 to 17.2 be/yr] ($p = .009$). Emergency department visits among the intervention group decreased from 4.5/year to 1.5/year ($p < .0001$) after the intervention, making their utilization of this resource indistinguishable from the control group ($n=13149$) at 1 year.

CONCLUSIONS: Mind body interventions in general and 3RP in specific have the potential to substantially reduce healthcare utilization at relatively low cost. Such interventions are likely to be useful in population supported self-care and may potentially help reduce the healthcare's demand curve, further study is called for,

RESULTS FROM NEXT-D: DOES A DISEASE SPECIFIC HEALTH PLAN REDUCE INCIDENT DIABETES DEVELOPMENT AMONG A NATIONAL SAMPLE OF WORKING-AGE ADULTS WITH PRE-DIABETES? Tannaz Moin^{2, 4}; Jinnan Li³; O. Kenrik Duru³; Susan Ettner³; Norman Turk³; Lindsay Kimbro³; Abigail M. Keckhafer⁵; Robert H. Luchs⁵; Sam Ho⁵; Carol Mangione¹. ¹David Geffen School of Medicine at UCLA, Los Angeles, CA; ²David Geffen School of Medicine at ULCA, Los Angeles, CA; ³UCLA, Los Angeles, CA; ⁴VA Greater Los Angeles, Los Angeles, CA; ⁵UnitedHealthCare, Minneapolis, MN. (Tracking ID #2198946)

BACKGROUND: Pre-diabetes affects one in three US adults. About 30 % of affected individuals will progress to diabetes over 3–4 years. We hypothesized that the Diabetes Health Plan (DHP), which reduces cost-sharing for lifestyle interventions and metformin for persons with either pre-diabetes or diabetes, is associated with lower rates of progression from pre-diabetes to diabetes

METHODS: We conducted a retrospective, intent-to-treat analysis using 2009–13 insurance claim and laboratory data from employer groups contracting with UnitedHealth Care to purchase either the DHP or a standard health plan. We ran an employer-level propensity model to find groups offering standard plans most comparable to those offering the DHP. Time to diabetes development was calculated as the days from January 1, 2010 until development of diabetes, over a 4-year timeframe. Kaplan-Meier methods and a log-rank test were used to test unadjusted differences between employees in the DHP versus standard plans. Employee-level, multivariate Cox regressions were estimated to identify predictors of diabetes progression.

RESULTS: We analyzed data from 15,734 continuously enrolled patients with pre-diabetes ($N=1299$ from 9 employers offering the DHP; $N=14,435$ from 219 employers offering standard plans). Mean time to develop diabetes was 948 days ($SD=8.3$). Employees who were older, less affluent, obese, Hispanic, African-American, or Asian developed diabetes at a faster rate regardless of the health plan.

CONCLUSIONS: We found no significant difference in time to diabetes development for employees in groups with and without the DHP (HR 1.06, 95 % CI 0.94–1.20). These results suggest that reduced cost sharing for metformin and lifestyle interventions for those with known pre-diabetes may not prevent development of diabetes. Alternatively, it is possible that the increased follow-up and testing among DHP plan enrollees relative to those with a standard benefit may have led to greater detection of diabetes and biased our findings to the null.

RESULTS FROM NEXT-D: PROMOTING BREAST CANCER SCREENING IN A DIABETES/PRE-DIABETES SPECIFIC HEALTH PLAN Q. Kenrik Duru¹; Norman Turk¹; Susan Ettner^{1, 1}; Tannaz Moin²; Jinnan Li¹; Abigail M. Keckhafer³; Robert H. Luchs³; Charles Chan³; Neil Steers¹; Carol Mangione^{1, 1}. ¹UCLA, Los Angeles, CA; ²UCLA/VA Greater Los Angeles, Los Angeles, CA; ³UnitedHealthcare, Minneapolis, MN. (Tracking ID #2196155)

BACKGROUND: The Diabetes Health Plan (DHP) reduces cost-sharing for medications and physician visits, and facilitates access to disease management and telephonic coaching for patients with pre-diabetes or diabetes. While the primary focus of the plan is reducing incident diabetes and/or improving diabetes-related outcomes, the DHP is also designed to encourage other healthy behaviors such as cancer screening. As part of the Natural Experiments for Translation in Diabetes (NEXT-D) multicenter network, we evaluated whether employer purchase of the DHP was associated with higher mammography rates among eligible female employees.

METHODS: Using a quasi-experimental design, we conducted a retrospective, intent-to-treat, employer-level analysis of 2010–13 administrative claims and laboratory data from employer groups contracting with UnitedHealth Care to purchase either the DHP or a standard health plan. We ran an employer-level propensity model to find control employer groups most comparable to those that purchased the DHP. We defined diabetes in both the DHP and control groups based on the presence of at least one 250.xx ICD-9 claim, any A1c value ≥ 6.5 %, or use of any antidiabetic medication other than metformin. We defined pre-diabetes based on the absence of any 250.xx ICD-9 claims, having at least one 790.21 or 790.22 claim, or any A1c value 5.7–6.4 %, fasting plasma glucose value of 100–125 mg/dl, or oral glucose tolerance test value of 140–199 mg/dl. Our primary outcome was at the employer level, measuring the percentage of female enrollees 50–64 years of age who had a screening mammogram during the 2 years after DHP implementation (or a similar time frame for the control employers). We also examined mammography rates for this group using a 3-year follow-up period. While mammography recommendations are controversial for women between 40 and 49 years of age, we also examined mammography rates for women 40–64 years of age over the same study windows. Among DHP employers, the analyses included all women of eligible age regardless of whether or not they were actually enrolled in the DHP. We applied inverse propensity weighting to the comparison samples, to adjust for inter-group differences. We expressed results at the Average Treatment Effect on the Treated (ATET). All analyses were conducted using STATA 13.

RESULTS: We analyzed data from 26,810 women 50–64 years of age with diabetes or pre-diabetes who were continuously enrolled for 3 years ($N=1282$ from 9 employers offering the DHP; $N=25,528$ from 240 employers offering standard plans). The expanded sample of women 40–64 years of age with diabetes or pre-diabetes who were continuously enrolled for 3 years included 1628 women in the 9 DHP employers and 31,910 women in the 240 employers offering standard plans. In weighted analyses using the 2 year follow-up study window, the predicted percentages of having a mammogram were 60.8 % without DHP purchase and 67.8 % with DHP purchase, for women aged 50–64 years ($+7.0$, $p=0.01$). Among women aged 40–64, the predicted percentages were 62.8 % without DHP purchase and 68.0 % with DHP purchase ($+5.2$, $p=0.07$). In weighted analyses using the 3 year follow-up study window, the predicted percentages of having a

mammogram were 68.7 % without DHP purchase and 73.7 % with DHP purchase, for women aged 50–64 years ($+5.0$, $p=0.09$). Among women aged 40–64, the predicted percentages were 73.0 % without DHP purchase and 76.5 % with DHP purchase ($+3.5$, $p=0.14$).

CONCLUSIONS: Employer purchase of the Diabetes Health Plan (DHP), a disease-specific plan for patients with diabetes or pre-diabetes, was associated with an increase in mammography rates among women 50–64 years of age over the first 2 years of plan implementation when compared to employers that did not purchase the DHP. These findings suggest that messaging and encouragement about general preventive care may be effective even within a disease-specific health plan targeting individuals with high-risk conditions, and may inform the design of similar plans in the future.

RETROSPECTIVE REVIEW OF RESISTANT CRYPTOCOCCAL MENINGITIS IN IMMUNOCOMPROMISED HOSTS Hachem Nasri¹; Sarah Kabbani¹; Melhim Bou Alwan²; Albert Anderson¹; Nadine Rouphael¹. ¹Emory University, Atlanta, GA; ²West Georgia Health, Lagrange, GA. (Tracking ID #2196047)

BACKGROUND: Cryptococcosis, caused by an environmental yeast *Cryptococcus neoformans*, occurs predominantly in immunocompromised individuals. While cryptococcosis is now more effectively treated with anti-fungal agents, the mortality rates for cryptococcal meningitis remains significant, and resistance to first line maintenance therapy, particularly fluconazole, has been reported. However, predictors of fluconazole resistance and outcomes remain underreported.

METHODS: A retrospective chart review was done on all patients admitted with cryptococcal meningitis, who had susceptibility testing performed on their cerebrospinal fluid (CSF) specimens, between 2001 and 2011, at Emory University affiliated hospitals and the Grady Health System in Atlanta, Georgia. We report a descriptive analysis of the patients' demographics, clinical and laboratory characteristics, and their outcomes. A univariate analysis for the predictors of fluconazole resistance, central nervous system (CNS) complications and mortality is reported.

RESULTS: A total of 35 patients were identified, 13 (37.1 %) of which had fluconazole resistance ($MIC > 8$). Eighty percent were males with African-American predominance (80 %), and the median age was 37 years. Furthermore, 80 % of the patients were HIV positive, while the rest were solid organ transplant recipients, except for one patient without a known immunocompromising condition. Subsequent recurrence of cryptococcal meningitis was more likely in HIV patients compared to solid organ transplant patients (p -value 0.0366). Overall, there was a statistically significant increase in fluconazole resistance in patients who had a history of prior azole use (OR 10.12, CI 2.04–50.15). Patients with fluconazole resistance and those with a high CSF cryptococcal antigen load (> 512) were more likely to have CNS complications (p -values 0.023 and 0.0358, respectively). On the other hand, patients who received voriconazole or high dose fluconazole (≥ 800 mg) for maintenance therapy showed a trend towards lower CNS complications, although not statistically significant (43 vs. 22 %). No increased risk of mortality was found with fluconazole resistance, however patients who received voriconazole or high dose fluconazole for maintenance therapy were more likely to survive (p -value 0.0195).

CONCLUSIONS: This retrospective study shows that immunocompromised patients with cryptococcal meningitis who have a history of prior azole exposure are more likely to develop fluconazole resistance and subsequent CNS complications; voriconazole or high dose fluconazole, however, are associated with lower CNS complications and a trend towards lower mortality. In addition to limited sample size, only cases where fluconazole susceptibility testing was performed on CSF samples were included in this study, thus no firm conclusions can be made on the effect of fluconazole resistance on mortality. Although this study shows an association between azole exposure and subsequent CNS complications, additional studies are required to further investigate the morbidity and mortality associated with fluconazole resistance in cryptococcal meningitis, to determine when it is appropriate to request susceptibility testing, and to evaluate its cost-effectiveness.

RISK OF PERIPHERAL NEUROPATHY IN PATIENTS INITIATING THALIDOMIDE OR LENALIDOMIDE FOR MULTIPLE MYELOMA: A PROPENSITY SCORE-MATCHED COHORT STUDY Jing Luo¹; Joshua Gagne²; Jerry Avorn³; Aaron Kesselheim¹. ¹Brigham and Women, Boston, MA; ²Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women's Hospital / HMS, Boston, MA; ³Harvard Medical School, Boston, MA. (Tracking ID #2200711)

BACKGROUND: In recent years, thalidomide and lenalidomide have become preferred agents in chemotherapy for multiple myeloma. Lenalidomide is a chemical derivative of thalidomide and is believed to have greater efficacy and a more favorable side-effect

profile, particularly with respect to the occurrence of peripheral neuropathy, though there is limited information from direct comparative trials. Thalidomide will soon be generic, while patent-protected lenalidomide costs about \$160,000/year. We performed an observational study to assess the comparative risk of peripheral neuropathy and death in a large population of typical myeloma patients receiving routine care.

METHODS: We identified patients with multiple myeloma who initiated lenalidomide or thalidomide within a large national health insurance claims database. We used propensity scores to match initiators on a large number of potential confounders, including age, sex, comorbidities, and other drugs comprising patients' initial treatment regimens. We followed patients from first use of either drug until censoring, defined as: development of a pre-specified clinical outcome, end of study (December 31, 2013), treatment discontinuation (plus 90 days), initiation of the other study drug, stem cell transplant, or bortezomib use during follow-up. The primary clinical outcome was a new diagnosis of peripheral neuropathy; secondary clinical outcomes were a new prescription of a medicine to treat neuropathic pain or death. Cox proportional hazards regression was used to estimate hazard ratios (HR) and 95 % confidence intervals (CI).

RESULTS: We identified and propensity-score matched 838 thalidomide initiators to the same number of lenalidomide initiators. Among new users of thalidomide, 76 (9 %) developed peripheral neuropathy during 487 person-years of follow-up. Among new users of lenalidomide, 114 (14 %) developed neuropathy during 444 person-years. Lenalidomide was associated with a higher rate of peripheral neuropathy (HR 1.67, 95 % CI:1.25–2.23), and a higher risk of being prescribed a medication to treat neuropathic pain (HR 1.46, 95 % CI:1.16–1.84), but a reduced risk of death (HR 0.56, 95 % CI:0.36–0.86). When we varied the duration of follow-up in sensitivity analyses, HRs were materially unchanged.

CONCLUSIONS: This study of 1676 treatment-naïve myeloma patients found that incident peripheral neuropathy may be more common for lenalidomide users than previously suspected. However, if confirmed, the survival advantage seen with lenalidomide would far outweigh this risk.

RISK STRATIFICATION METHODS AND PROVISION OF CARE MANAGEMENT SERVICES IN COMPREHENSIVE PRIMARY CARE INITIATIVE PRACTICES Ashok Reddy^{2,3}; Laura L. Sessums^{1,3}; Tim Day³; Jonathan Fried³; Bruce Finke³; Asaf Bitton³. ¹USUHS, Washington, DC; ²University of Pennsylvania, Philadelphia, PA; ³Center for Medicare & Medicaid Innovation, Baltimore, MD. (*Tracking ID #2197498*)

BACKGROUND: Risk-stratified care management strategies are key to the development of population health management capabilities in primary care practices. The goal of risk-stratified care management is to align the limited resources of a practice to patients most in need of these services. Evidence on the typology and utility of different patient risk stratification methods at the practice level, and their association with care management services, is limited. The Comprehensive Primary Care initiative (CPC) is a large-scale, multi-state, multi-payer test of a new primary care payment and practice transformation model developed by the Center for Medicare and Medicaid Innovation. One key component of CPC is directed at implementing practice-wide risk-stratified care management. We conducted an analysis of the risk stratification methods CPC practices initiated in the first year of the program and evaluated the association between the type of risk stratification methodology and the provision of care management services.

METHODS: CPC practices reported on their risk stratification strategy at the end of the first year of the initiative (2013). We used a modified Grounded Theory approach to analyze CPC practices' responses to a qualitative question on methods used for risk stratification of their patient population. Two members of the research team reviewed a random sample of 20 responses to identify concepts and categories in the data. Through consensus, risk stratification typologies were developed and applied to categorize the risk stratification methodology in 493 CPC practices. CPC practices also reported quantitative data on the number of patients in the highest two risk strata that resulted from the risk stratification of their population and the number of patients in those two strata who received care management services. Based on the data we determined the overall proportion of high-risk patients who received care management. With available practice level data on practice size, medical home recognition, ownership type, meaningful use (stage 1) providers, and geographical area (state and rural/urban), we used a generalized linear equation, controlling for the above practice level characteristics, to test if risk stratification methodology was associated with the overall proportion of high-risk patients who received care management.

RESULTS: All 493 practices submitted risk stratification methodology reports. CPC practices reported using four major methods to risk stratify their patient populations: payer claims/electronic health record (13 %), publicly available clinical algorithm (31 %), practice-developed algorithm (44 %), clinical intuition (11 %) (<1 % of practices did

not report). The average percentage of high-risk patients who received care management in CPC practices was 39 % (SD 36 %). The percentage of high-risk patients who received care management differed by risk stratification method: clinical intuition (50 %), payer claims/electronic health records (43 %), practice-developed algorithm (37 %), and publicly available clinical algorithm (36 %). In our primary analysis, after adjusting for practice level characteristics, we found the following statistically significant result: practices that chose to risk-stratify using clinical intuition had a 12 percentage point higher rate (95 % CI, 1–24 %, P-value 0.04) in the overall percentage of high-risk patients receiving care management when compared to practice-developed clinical algorithm.

CONCLUSIONS: Our findings offer some of the first insights into the ways practices implement risk stratified care management while undergoing rapid primary care transformation linked to payment reform. A key challenge for primary care practices is implementing population health management with limited resources: First, the financial resources to spend on commercial risk stratification software and second, the time needed to implement claims or clinical algorithms to identify high-risk patients. We find practices using clinical intuition, potentially the fastest and cheapest strategy to implement, provided care management to the highest proportion of their high-risk patients.

RISKY BUSINESS: EVALUATION OF PHYSICIAN ADHERENCE TO NEW ACC/AHA CHOLESTEROL GUIDELINES FOR DIABETIC PATIENTS

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BACKGROUND: In November 2013, the American College of Cardiology/American Heart Association (ACC/AHA) published new cholesterol guidelines to reduce atherosclerotic cardiovascular risk. Focus shifted from achieving specific LDL targets to identifying high-risk patients with atherosclerotic cardiovascular disease (ASCVD), diabetes, or primary dyslipidemia. An ASCVD calculator estimating 10-year risk for myocardial infarction or stroke was created to stratify statin intensity (moderate- vs. high-intensity) based on a clinically validated 7.5 % cutoff and specific statin benefit categories. In diabetic patients, statins are recommended for all individuals aged 40–75 years, with the intensity determined by 10-year risk. Our study assessed both attending and resident physician prescribing practices in diabetic patients to determine knowledge of and adherence to the new cholesterol guidelines.

METHODS: We retrospectively reviewed the charts of diabetic patients cared for in a general internal medicine residency/faculty practice. Inclusion criteria included diabetics over 21 years old who had been evaluated by a clinic physician within the year prior to project initiation. In total, 255 patients were included. Baseline data were collected using EMR generated diabetes compliance reports. We compared actual statin prescriptions to ACC/AHA recommended statin medication and dose at both 8 months (June 2014) and 12 months (November 2014) following release of the new guidelines. A seven question de-identified survey was administered to providers to evaluate knowledge of new ACC/AHA guidelines.

RESULTS: Baseline characteristics of the 255 patients are summarized in Table 1. Patients were predominantly female (54 %), African American (61 %), and active or former smokers (56 %). Average A1c was 7.8 % and blood pressure was well-controlled. Average ASCVD risk score was 23.2 % with 89 % of patients requiring high intensity statin. Comparing June and November 2014 data, there was no statistical difference in the percent of patients on any statin (74 vs. 76 %, $p=0.68$) or those on the correct intensity (37 vs. 41 %, $p=0.40$). We also compared prescribing practices of attending and resident physicians and found no statistical difference between the two groups for percent of diabetic patients on any statin ($p=0.76$) or correct intensity statin ($p=0.52$) in July 2014. Similar non-significant differences were observed between groups in November 2014. In a survey of 34 physicians, 88 % responded that their statin prescribing practice was based on the 2013 ACC/AHA guidelines and 85 % used the ASCVD risk calculator 'often'. However only 50 % correctly answered two vignettes that assessed knowledge of the new guideline recommendations, including statin choice and intensity.

CONCLUSIONS: Our study is the first that we know of to assess knowledge of and adherence to the ACC/AHA cholesterol guidelines in a resident/faculty clinic practice. While physicians in the study effectively prescribed statins for diabetic patients, they were less successful at correctly selecting statin intensity, particularly when higher intensity was required. Our survey results suggest this suboptimal prescribing practice may be due to a knowledge gap. Furthermore, only minimal prescribing improvements were seen over time suggesting persistent lag time between guideline release and their incorporation into clinical practice. Lastly, we found no differences in prescribing practices between faculty and residents indicating poor adherence to guideline recommendations regardless of the level of physician experience.

Baseline Characteristics of Diabetic Patients

Characteristic (n=255)	Mean (SD)
Gender (%):	
Female	54.1
Male	45.9
Race (%):	
African American	60.8
Caucasian	35.7
Other	4.5
Smoking History (%):	
Never	44.3
Active	20
Former	35.7
On Treatment for Hypertension (%)	
No	12.2
Yes	87.8
HgA1c (%)	7.8 (2.1)
Systolic Blood Pressure	133.7 (16.3)
Diastolic Blood Pressure	78.8 (10.7)
Total Cholesterol	189.9 (39.0)
HDL	47.0 (14.0)
LDL	113.0 (35.8)
Triglycerides	156.9 (113.4)
10-Year ASCVD Risk Score (%)	23.2 (12.8)
Statin Intensity Recommendation (%)	
Moderate	11.4
High	88.6
Clinic Providers (%)	
Attending	67.1
Resident	32.9

ROLE-MODELING COST-CONSCIOUS CARE—A NATIONAL EVALUATION OF FACULTY AT TEACHING HOSPITALS IN THE UNITED STATES

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BACKGROUND: Little is known about how well faculty at teaching hospitals role-model behaviors consistent with cost-conscious care. The objective of this study was to evaluate whether faculty at teaching hospitals in the United States (US) role-model cost-conscious care and whether role-modeling is impacted by the presence of a formal residency curriculum in cost-conscious care.

METHODS: Data on internal medicine resident perceptions of faculty behaviors were obtained from responses to a questionnaire administered during the Internal Medicine In-Training Examination in October 2012 (response rate: 83.7 %). Data on internal medicine program director perceptions of faculty behaviors were obtained from responses to a cost-consciousness questionnaire administered electronically in August 2012 (response rate: 70.5 %). To evaluate a more comprehensive assessment of faculty behaviors, resident and program director perceptions data were merged to match residents with the director of their residency program. The study sample included 12,623 paired responses from residents and their program directors. The main outcome measure was the perception of faculty role-modeling cost-conscious care. Multivariate logistic regression models were fit to the outcome variable using paired survey responses from US internal medicine residents and their program directors, adjusting for resident, program director, and residency program characteristics. Sensitivity analyses were performed by independently evaluating the model using the outcome measure as only perceptions of internal medicine residents and only perceptions of internal medicine program directors.

RESULTS: Among 253 residency programs, 37 (14.6 %) had a formal curriculum in cost-conscious care, 127 (50.2 %) did not but were working on it, and 89 (35.2 %) did not have a curriculum. A higher proportion of residents (52.7–54.7 %) than program directors (39.4–44.7 %) agreed that faculty consistently role-model cost-conscious care. Only one-fourth of the time (23.0–26.7 %) did the resident and their program director both agree. In the adjusted model, presence of a formal curriculum in cost-conscious care did not have a significant impact on perceptions (odds ratio [OR], 1.04; *P*=0.91). Higher odds of agreement were found among residency programs that were community-based (OR, 3.20; *P*<0.01), community-based, university-affiliated (OR, 1.80; *P*=0.02) and located in the South (OR, 2.09; *P*=0.02). Compared to US medical school graduates, higher odds of agreement were found among residents who trained at foreign medical schools (OR, 1.39; *P*=0.03). These findings were supported by

sensitivity analyses evaluating perceptions of residents and program directors independently.

CONCLUSIONS: The majority of residents and program directors reported that faculty at US teaching hospitals were not consistently role-modeling cost-conscious care. Presence of a formal curriculum in cost-conscious care did not impact perceptions. Future efforts should focus on placing more emphasis on faculty development and combining curricular improvements with institutional interventions to adapt the training environment.

ROUTINE INPATIENT HCV SCREENING OF 4582 BABY BOOMERS: LOWER HCV PREVALENCE BUT MORE ADVANCED DISEASE IN NEWLY DIAGNOSED MEXICAN-ORIGIN HISPANICS

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BACKGROUND: Guidelines now recommend one-time Hepatitis C virus (HCV) screening of all baby boomers (born 1945–1965). National surveys report that Hispanics are less likely to have HCV infection than non-Hispanic whites (NHW) or blacks and, among Hispanics, persons from Puerto Rico are more likely to be infected than those of Mexican origin. Given these data, regions of the country with majority Mexican-origin populations might place lower priority on implementing HCV screening. In a prospective cohort of primarily Mexican-origin baby boomers admitted to a South Texas hospital, we examined the association of race-ethnicity and other demographic characteristics with HCV infection and, for chronic HCV, with hepatocellular carcinoma (HCC) or cirrhosis on imaging studies.

METHODS: A prospective cohort of never screened baby boomers admitted to a safety net hospital in San Antonio was screened for eligibility (birth year 1945–65, no prior HCV diagnosis or prior HCV test, not admitted to psychiatry, and no metastatic cancer) using an electronic medical record algorithm from 12/1/2012 to 9/30/2014 and followed through 12/10/2014. Anti-HCV antibody (anti-HCV) and reflex HCV RNA were performed on eligible patients with opt out consent. Anti-HCV positive (+) patients received inpatient counseling and outpatient case management for linkage to primary and specialty HCV care. Logistic regression models examine the association of age, gender, self-reported race-ethnicity, and insurance status with three outcomes: anti-HCV +, HCV RNA + (chronic HCV), and cirrhosis or likely HCC on imaging by liver ultrasound or CT scan.

RESULTS: Of 4582 unique patients screened for HCV, the mean age was 57.0 (SD 5.7) 56.7 % men, 58.4 % Hispanic (Mexican-origin), 33.3 % NHW, 5.2 % Black, 3.1 % Asian/other and 45.1 % uninsured. Of screened patients, 316 (6.9 %) were anti-HCV +, of whom 287 (91 %) received HCV RNA testing. HCV RNA was detected in 175 (61.0 %) indicating chronic HCV (3.8 % of all screened patients). Adjusted odds of anti-HCV+ were significantly higher for men but reduced for increasing age and Hispanics or Asian/other race compared with NHW (Model 1, Table). Age had the only significant association with HCV RNA+ (Model 2) with lower odds for increasing age. Of chronically infected patients, 125 (71 %) had an imaging study and 60 (48 %) were reported to have cirrhosis or HCC. Increasing age and Hispanic ethnicity were associated with significantly higher odds of cirrhosis/HCC; notably Hispanics were over three-fold more likely to have advanced disease than NHW/Asian/other. Across all models, uninsured persons had higher odds of these outcomes but did not reach statistical significance.

CONCLUSIONS: In this prospective cohort, Hispanics of primarily Mexican-origin had lower prevalence of anti-HCV but over 3-fold greater odds of advanced disease on imaging than NHW. These data reinforce the value of HCV screening in Hispanics of Mexican origin despite their having a lower prevalence of HCV.

Associations of Patient Demographic Characteristics with HCV Screening Results and Advanced Liver Disease on Imaging

Characteristic	Model 1: Anti-HCV +	Model 2 HCV RNA +	Model 3 Cirrhosis/HCC
Adjusted odds ratio (95 % confidence interval)			
Age	0.93 (0.91–0.95)‡	0.95 (0.90–1.00)*	1.13 (1.03–1.25)†
Men	2.66 (2.03–3.50)‡	1.24 (0.69–2.23)	1.38 (0.46–4.12)
Race-Gender			
Hispanic	0.70 (0.55–0.90)†	0.85 (0.51–1.42)	3.60 (1.49–8.67)†
Black	1.12 (0.69–1.82)	2.15 (0.72–6.42)	0.43 (0.07–2.62)
Asian/Other	0.22 (0.08–0.79)*	0.41 (0.04–4.76)	–
Uninsured	1.25 (0.99–1.59)	1.38 (0.84–2.29)	2.00 (0.87–4.61)

P value: * <0.05, † <0.01 ‡ <0.001

Reference groups: women, non-Hispanic White (plus Asian/other for model 3), insured.

SATISFACTION WITH HEALTH CARE AMONG PATIENTS NAVIGATED FOR PREVENTIVE CANCER SCREENING Emilia A. Hermann²; Steven J. Atlas¹; Jeffrey M. Ashburner¹; Sanja Percec-Lima¹. ¹Massachusetts General Hospital, Boston, MA; ²Perelman School of Medicine University of Pennsylvania, Philadelphia, PA. (Tracking ID #2198829)

BACKGROUND: The Affordable Care Act includes provisions that support population health management activities as part of fostering accountable care organizations. The use of patient navigation (PN) for vulnerable patients may help ensure that population-based interventions, such as preventive cancer screening, improve equity of care. In a large, diverse academic primary care network, we implemented a PN program as part of a visit-independent, population management system for comprehensive cancer screening in vulnerable patients. As part of a randomized control trial (RCT) comparing PN to usual care for patients at increased risk for non-adherence to screening, we surveyed patients about satisfaction with overall medical care and in intervention patients with the PN program. Little is known about patient perception and satisfaction with this novel type of PN and whether it may influence patient satisfaction with overall medical care.

METHODS: The RCT took place from April to December 2014. This study began in October 2014. Introductory letters about the survey were sent in batches of 80 per week to equal numbers of randomly selected patients in the control and PN (intervention) arm. In order to best capture patient satisfaction with PN, patients were only asked to participate in this study if they had contact with a navigator after July 2014. No remuneration was provided for participation. Patients were then contacted by phone 1 week after the introductory letter was mailed and asked to complete the PSQ-18 "Short-form Patient Satisfaction Questionnaire" (PSQ-18: scores range from 18 to 90). Patients in the intervention (PN) group were also asked to complete the "Satisfaction with Interpersonal Relationships with Navigator" (PSN-I), a validated instrument with scores that range from 9 to 45. We compared patient satisfaction with overall medical care between the two study arms, as measured by the PSQ-18, using a two-sample t-test. In the PN (intervention) patients, we also evaluated the relationship between patient satisfaction with PN (as measured by PSN-I) and their satisfaction with overall medical care (as measured by PSQ-18) using a linear regression model.

RESULTS: There were 792 patients in the PN arm and 820 in the control arm. Phone surveys are ongoing with completion expected by the end of February 2015. As of January 1, 2015, 126 of 400 patients (31.5 %) agreed to participate and completed the survey (66 intervention and 60 control). Among patients not agreeing to participate, 233 (58.3 %) could not be contacted (134 intervention and 140 control) and 41 (10.3 %) were contacted but declined (14 control, 27 intervention). Respondents had a mean age of 57.6 years, most were female (60.4 %) and white (79.8 %), and 50 % had commercial health insurance. There was no difference in age, gender, race, primary language, or type of insurance among intervention and control group respondents. Patients who were contacted by a PN in the intervention group had higher satisfaction with their overall medical care compared to control patients (mean PSQ-18: 71.8 vs. 67.8, $p=0.002$). The average PSN-I score among the 66 intervention respondents was 38.1 (SD: 6.2). To evaluate the relationship between satisfaction with patient navigation and overall satisfaction with medical care, a regression model evaluating the relationship between PSN-I score and PSQ-18 score among intervention patients demonstrated a positive association ($R^2=0.2194$, p -value <0.001). However, only 22 % of the PSQ-18 score variation is explained by PSN-I scores.

CONCLUSIONS: Among patients at increased risk of non-adherence for preventive cancer screening, those randomized to a PN intervention had higher overall satisfaction with medical care. For intervention patients, there was positive relationship between higher PN satisfaction scores and higher general satisfaction scores. This study suggests that systematically addressing patient-identified barriers to care using PN may improve patient perception of health care overall.

SEEKING EMERGENCY CONTRACEPTION IN DENVER, COLORADO: A HEALTH IMPACT ASSESSMENT Alia Moore²; Dr. Carol Stamm⁴; Laura Borgelt⁴; Dan Topp¹; Rachel Blumhagen³; Leanne Rupp¹; Christine Gilroy². ¹The Colorado Health Foundation, Denver, CO; ²University of Colorado Anschutz Medical Campus, Denver, CO; ³University of Colorado Denver, Aurora, CO; ⁴University of Colorado, Aurora, CO. (Tracking ID #2190499)

BACKGROUND: Emergency contraception (EC)—a progestin-only pill that reduces the risk of pregnancy by delaying or inhibiting ovulation—is important for comprehensive reproductive health. Brand-name Plan B One-Step has been available over the counter without age restrictions since June 2013; generic medications have been widely available since February 2014. EC is a very effective medication when taken correctly, although recent European research suggest reduced efficacy in heavier women. Previous studies

have identified various barriers to EC access, including ethical objections and propagation of outdated information. Our study aimed to evaluate potential barriers to EC access within the Denver area.

METHODS: A female resident posing as a 190-lb woman called 118 Denver pharmacies seeking EC. Using a predetermined script, the resident inquired about EC availability and location (over the counter or behind it), cost, age restrictions, ID requirements and weight considerations. Data was input into a RedCap database and analyzed using descriptive statistics and Fisher's exact testing.

RESULTS: Ninety-three percent (110/118) of phone calls were successful. 23/110 (20.91 %) pharmacies had complete access, defined as in-stock and on-the-shelf without ID requirements; none of these were independent. 17/110 (15.45 %) pharmacies had no EC in stock, 7/17 (41.18 %) of which never carry it. 26/110 (23.64 %) pharmacies keep generic EC behind the counter. Mean cost of Plan B: \$48.61; mean cost of generic EC: \$40.83. 54/110 (49.09 %) inaccurately reported age restrictions or ID requirements for any form of EC. Only 19/110 (17.27 %) pharmacies were aware of potentially reduced EC efficacy in heavier women. Of these 19, 3 (15.79 %) offered alternative forms of EC.

CONCLUSIONS: Pharmacy employees were forthcoming with EC information, but demonstrated significant knowledge gaps regarding age restrictions and current research. This study suggests that timely, comprehensive and ongoing EC education for both pharmacists and pharmacy technicians may help overcome these barriers and encourage accurate patient counseling.

SELF-DIRECTED LEARNING AMONG INTERNAL MEDICINE RESIDENTS: A QUALITATIVE STUDY USING GROUNDED THEORY Adam P. Sawatsky; John T. Ratelle; Sara Bonnes; Jason Egginton; Thomas J. Beckman. Mayo Clinic, Rochester, MN. (Tracking ID #2196264)

BACKGROUND: Self-directed learning (SDL) is a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating goals, identifying resources for learning, choosing learning strategies, and evaluating learning outcomes. SDL overlaps many of the Accreditation Council for Graduate Medical Education core competencies and is woven into the language of practice-based learning and improvement, including evaluating one's own knowledge, setting learning goals, incorporating formative evaluation feedback into practice, and using scientific evidence. Previous qualitative studies reveal that residents recognize the importance of SDL but frequently experience difficulty with the application of SDL. While previous studies have guided the development of SDL curricula, significant gaps remain in our understanding of the practice of SDL by residents. Our goal was to build a theory to explain the process of SDL within the residency training environment and to better understand the role that faculty members and residency programs play in the promotion and support of resident SDL.

METHODS: We used grounded theory to build a theoretical framework for understanding SDL during internal medicine residency training at the Mayo Clinic in 2014. The investigators have experience in qualitative research in medical education and have teaching roles in the residency program. We conducted focus groups of internal medicine residents, with separate focus groups for first-year and for upper-level residents to avoid power differentials. We developed the focus group guide through reviewing the literature, brainstorming, pilot-testing, reviewing with a panel of experts, and constantly comparing with acquired focus group data. A trained facilitator with experience in focus group moderation and with no connection to the residency program moderated the focus groups. The primary investigator served as note-taker. Focus groups were transcribed verbatim and the data was de-identified prior to analysis. Using a grounded theory approach, the analytic process involved reflection throughout the process of data collection. Team members reviewed transcripts from five serial focus groups using open coding and analytic memos to identify important themes and guide subsequent focus group discussions. Using constant comparison, we developed axial codes that were applied to each transcript. We refined the axial codes through open coding to identify new, emerging themes. We developed a theoretical model for the process of SDL which was refined over time until theoretical saturation was achieved.

RESULTS: We conducted five focus groups of 36 residents, with an average of 7 residents per group. SDL was triggered by problem that uncovered a learning need and then continued through setting goals, identifying content and resources, applying knowledge, and self-evaluation. The main trigger for SDL was patient care, but additional triggers included faculty, peer discussions, other-directed learning, news sources, push notifications and exam questions. There were several major themes that affected the process of SDL, including 1) motivations, 2) barriers and activators, 3) context, and 4) the role of external feedback and faculty support. SDL was driven by internal motivations (personal interest, desire to be a good physician) and external motivations (passing exams, "looking stupid" to others). The main barriers were time, amount of information to learn and not knowing how to focus learning. Activators included time for learning and thought,

and the provision of optimal resources. The context included program structure and culture, the structure of rotations and the social context of learning. Residents were clear about the crucial role of feedback from faculty members, peers, patients, and other sources to inform each step in the process of SDL, including self-evaluation. The residency program and individual faculty members were critical in guiding residents through the process of SDL, providing input at every step of the SDL process. Residents expressed that faculty members must understand a resident's specific learning need and goals within a specific context to effectively guide their SDL. Finally, residents preferred "collaborative self-directed learning" to being asked "why don't you look that up," with faculty modeling SDL to residents through working with the resident to seek answers to clinical questions.

CONCLUSIONS: To our knowledge, this represents the first study to present a theory of SDL among residents. Our theory delineates a process that evolves from the identification of learning need to the self-evaluation of learning, and there are multiple influences to this process, including motivations for learning and barriers to SDL. Ultimately, this model may serve to cultivate learning environments that optimize SDL and competency-based assessment in resident education.

SHARED DECISION MAKING DURING INPATIENT ROUNDS: OPPORTUNITIES FOR IMPROVEMENT IN PATIENT ENGAGEMENT AND COMMUNICATION Stephanie M. Harman¹; Poonam Hosamani¹; Lisa Shieh¹; Eric Huynh¹; Stephanie Rennke²; Bradley Monash³; Patrick Yuan⁴; Joan F. Hilton³; Rebecca Blankenburg²; Debbie S. Sakai¹; Ian Chua¹; Adeena Khan³; Lijia Xie³; Jason Satterfield⁴. ¹Stanford University, Stanford, CA; ²Stanford University School of Medicine, Palo Alto, CA; ³UCSF, San Francisco, CA; ⁴University of California, San Francisco, San Francisco, CA. (Tracking ID #2198113)

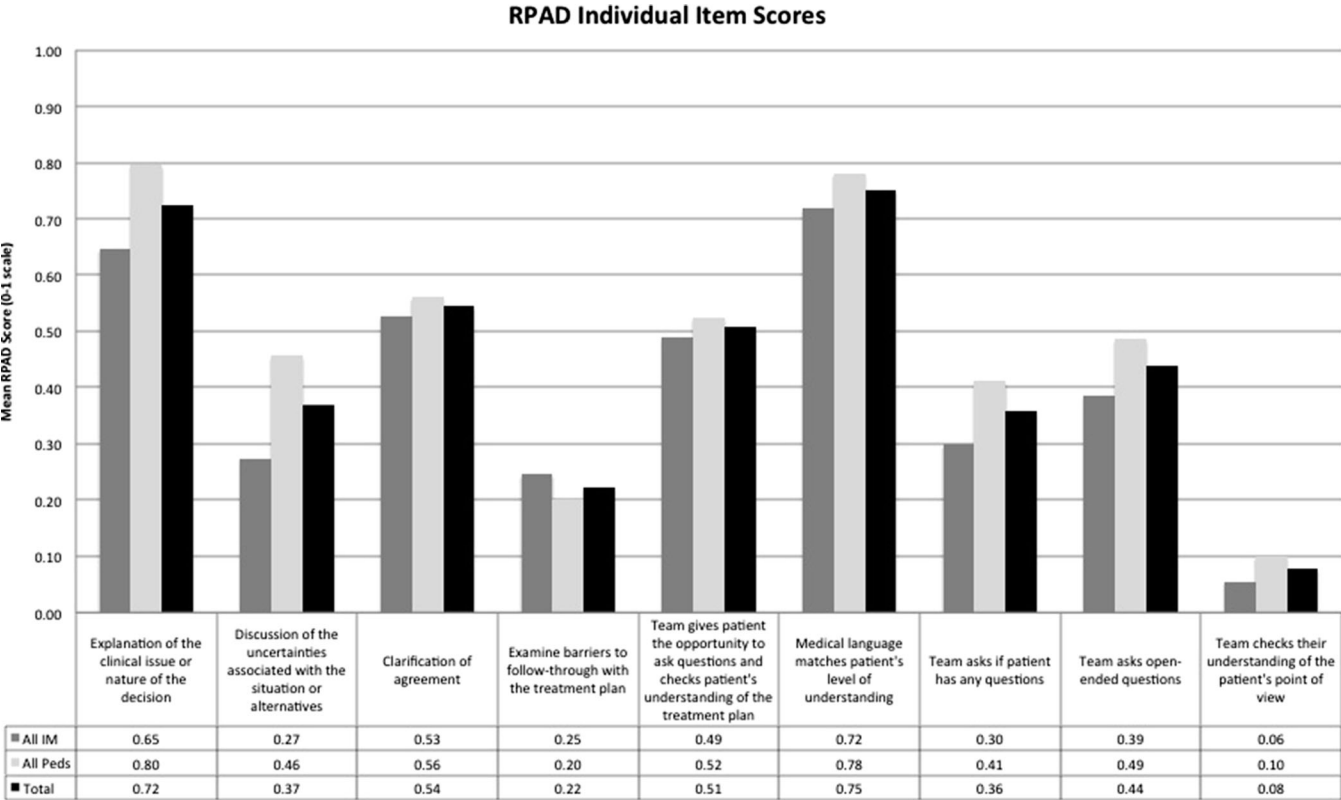
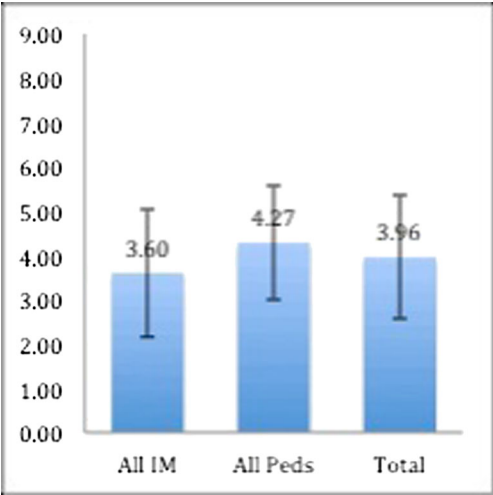
BACKGROUND: Shared decision-making (SDM) has been shown to be an important tool for improving patient engagement and health care outcomes. Evidence indicates that patients are both willing and able to engage in SDM with their providers. Despite the demonstrated value of SDM across disciplines, little is known about the extent of SDM occurring in general inpatient settings. We sought to quantify the presence of key SDM behaviors during morning rounds on general pediatrics and internal medicine services at two academic hospitals.

METHODS: We completed an IRB-approved cross-sectional study of inpatient ward rounds on pediatric and internal medicine services at two large academic hospitals over a

12-week period. Twelve physicians trained to use a validated observation tool, the Rochester Participatory Decision-Making Scale (RPAD) a 9-item survey, observed the occurrence of SDM behaviors on inpatient rounds. Mean scores across all RPAD items were calculated, and performance across medicine and pediatrics services was compared using t-tests.

RESULTS: A total of 32 teams (16 medicine, 16 pediatrics), 89 ward rounds (47 medicine, 48 pediatrics), and 268 unique patient encounters (127 medicine, 141 pediatrics) were observed. The overall performance in pediatrics trended higher than in medicine (mean total RPAD score of 4.27 vs. 3.60, $p < 0.001$, scores range 0.5–9.0, Figure 1). The most frequently observed behaviors across all services included: explaining the clinical issue or nature of the decision and matching medical language to the patient's level of understanding. The least frequently observed behaviors included checking understanding of the patient's point of view, examining barriers to follow-through with the treatment plan, and asking if the patient has any questions (Figure 2).

CONCLUSIONS: Opportunities exist to improve patient care and health outcomes by strengthening SDM on rounds through checking understanding of the patient's perspective, examining barriers to follow-through with the treatment plan, and asking if the patient has questions.



SHARED DECISION-MAKING DURING INPATIENT ROUNDS: DISSIMILAR YET CORRELATED PERSPECTIVES OF PATIENTS/GUARDIANS AND PHYSICIAN OBSERVERS Stephanie Rennke²; Bradley Monash^{2, 5}; Rebecca Blankenburg¹; Patrick Yuan³; Stephanie M. Harman⁴; Joan F. Hilton³; Debbie S. Sakai¹; Ian Chua¹; Eric Huynh⁴; Poonam Hosamani⁴; Adeena Khan²; Lisa Shieh⁴; Lijia Xie²; Jason Satterfield³. ¹Stanford University School of Medicine, Palo Alto, CA; ²UCSF, San Francisco, CA; ³University of California, San Francisco, San Francisco, CA; ⁴Stanford University School of Medicine, Stanford, CA; ⁵Pediatrics, UCSF, San Francisco, CA. (Tracking ID #2197867)

BACKGROUND: Educating and empowering patients to actively participate in their own care through shared decision-making (SDM) can improve patient satisfaction as well as health outcomes. Prior work has led to the development and validation of tools to assess the quality of key SDM behaviors, predominantly in the outpatient setting. Using a validated instrument, we sought to compare patient and physician perception of specific SDM behaviors as they occurred on inpatient rounds.

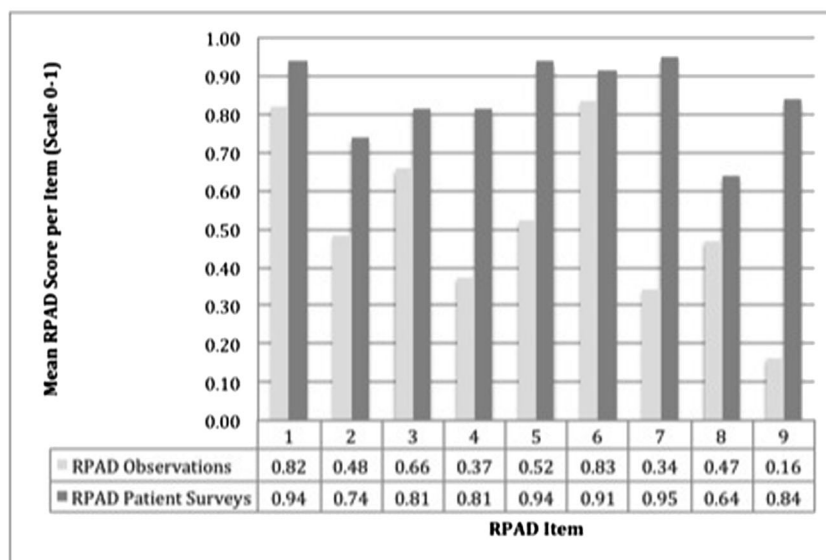
METHODS: We conducted a cross-sectional study of inpatient ward rounds on pediatric and internal medicine services at a large academic center over a 12-week period. Twelve physicians trained to use a validated observation tool (the nine-item Rochester Participa-

tory Decision-Making Scale (RPAD)) observed the occurrence of specific SDM behaviors on inpatient rounds, and scored each item (0=absent, 0.5=weak, 1=strong). We assessed patient/guardian perception of the quality of each of the nine items using a patient survey adapted from the RPAD. Research assistants blinded to the RPAD scores approached English-speaking patients/guardians after rounds to complete the surveys. We used t-tests to compare the scores of each item as assessed by the physician observers and patients/guardians.

RESULTS: SDM behaviors by physicians were collected for 115 unique patient encounters (44 medicine, 71 pediatrics) on 15 rounding teams (6 medicine, 9 pediatric) during 49 ward rounds (20 medicine, 29 pediatrics). Of the 115 patients, 40 (35 %) were administered patient-perspective RPAD surveys. Patients scored their physicians higher on average, by 32 % (2-sided paired t-test, $p=0.004$), compared with the scores given by physician observers. However, excluding Item 1, patients' and clinicians' assessments were high correlated, showing they identified strengths and weakness similarly ($r=0.68$; Figure).

CONCLUSIONS: Patients/guardians perceive the quantity and quality of shared decision-making on rounds more favorably than physician observers do; however, they identify similar strengths and weaknesses in the shared decision-making process.

Comparison of patient/guardian and physician observer assessment of shared decision-making on rounds



- 1=MD clearly explained medical issue or decision to be made
- 2=MD discussed alternatives or uncertainties
- 3=MD checked for patient agreement with plan
- 4=MD examined barriers to follow through with treatment plan
- 5=MD provided opportunity for patient to ask questions to ensure understanding
- 6=Patient understood what MD was saying
- 7=MD asked if patient had any questions
- 8=MD asked open-ended questions
- 9=MD checked own understanding of patient's point of view

SHOULD PRIMARY CARE PHYSICIANS REMAIN MORE INVOLVED IN THE CARE OF PATIENTS WITH ADVANCED CHRONIC KIDNEY DISEASE?

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BACKGROUND: Greater co-management between primary care physicians and nephrologists in chronic kidney disease (CKD) care is increasingly encouraged. Primary care physicians often have longer established relationships with patients with CKD compared to nephrologists, and may serve as a more trusted source for medical advice

and decision-making support. However, nephrologists most often deliver the majority of CKD care with insufficient continuity or collaboration with patients' primary care physicians. The extent to which patients with advanced, progressive CKD prefer to rely on their primary care physicians for medical advice is unknown.

METHODS: As part of the Talking about Living Kidney Donation (TALK) study, a randomized controlled trial of educational and behavioral interventions to improve consideration of living kidney transplantation, we assessed via the baseline questionnaire the extent to which patients with advanced, progressive CKD from Baltimore area nephrology practices reported they relied on their primary care physicians for medical care and advice rather than their nephrologist or other providers: "Between your kidney doctor, your primary care doctor, and your other doctors, which doctor do you most heavily rely on for care of your medical problems and for medical advice?" Using multivariate logistic regression, we also identified independent predictors of patients' primary reliance of their

primary care physician for care and advice compared to other physicians, adjusting for patients' demographics (age, race, and sex); CKD severity; duration and frequency of nephrology care; trust in medical care; and their perception of their nephrologists' patient centeredness.

RESULTS: Among 112 patients with advanced, progressive CKD (mean age 58 years), 58 % were female, 48 % were African American, and 82 % were high school graduates. The majority (69 %) of patients had Stage 4 CKD with a mean estimated glomerular filtration rate of 26.5 ml/min/1.73 m² and most (62 %) had been under nephrology care for at least 2 years. Patients most frequently reported they relied most heavily on their primary care physician for care and advice (46 %), while fewer reported they relied on all their physicians fairly equally (27 %), mostly on their nephrologist (21 %), or mostly with another provider (6 %). After adjustment for all other variables, patients receiving shorter duration nephrology care (51 % less than 2 years, 49 % 2–4 years, and 33 % five or more years, *p* for trend=0.03) or making less frequent visits to their nephrologists (56 % at least once a year, 52 % at least every 3 months, and 22 % at least every 2 months, *p* for trend=0.01) were more likely to rely mostly on their primary care physician for care and advice. Patient age, race, CKD severity, trust in medical care, or perception of nephrologists' patient centeredness were not associated with their likelihood of seeking care or advice from primary care physicians.

CONCLUSIONS: Despite being in nephrology care for prolonged time periods, the majority of patients with advanced, progressive CKD continue to rely heavily on their primary care physician for medical care and advice. While primary care physicians often become less involved in CKD care as patients near end-stage renal disease and prepare for renal replacement therapy, our results reinforce efforts to increase primary care physician involvement and improve nephrologists' and primary care physicians' collaboration in advanced CKD care.

SIBLINGS HISTORY IS A STRONGER PREDICTOR OF TYPE 2 DIABETES THAN PARENTAL HISTORY Gautam A. Deshpande^{2, 3}; Sachiko Ohde¹; Osamu Takahashi². ¹St. Luke's Life Science Institute, Tokyo, Japan; ²St. Luke's International University, Chuo-ku, Japan; ³University of Hawaii, Honolulu, HI. (Tracking ID #2196945)

BACKGROUND: Type 2 diabetes mellitus (T2DM) affects an approximate 387 million individuals worldwide, with an estimated prevalence of 11 % in the United States by 2035. Identification of at-risk individuals by primary care physicians may play an important role in disease prevention. While family history is a well-established risk factor for the development of T2DM, the details of this risk, including age at diagnosis in family members, remain unclear. This study aims to assess the risk of development of T2DM in apparently healthy individuals by relationship to parents and siblings with T2DM, as well as by age at which family members were diagnosed.

METHODS: This was a retrospective open cohort study of apparently healthy individuals presenting to an annual health screening clinic located in metropolitan Japan (St. Luke's International Hospital, Tokyo, Japan) between 2005 and 2010. Individuals without a previous history of DM, and taking no medications which might modify glucose levels, were included in the study and followed at return visits. At each visit, all patients completed a comprehensive screening questionnaire on new medical diagnoses, family history, and lifestyle habits. Newly diagnosed T2DM was the primary outcome; independent variables included first-degree family members with DM and age at DM diagnosis. Logistic regression models were built for those with newly diagnosed T2DM, comparing data based on parental and sibling DM history, and age at DM diagnosis, as well as stratifying data by BMI of index cases.

RESULTS: Of 52,820 individuals included, 1510 (2.9 %) developed T2DM during the study period (mean age, 53.8±11.1 years; 981 (65 %) male). Six thousand four hundred sixty-seven (12.2 %) patients had a parental history of DM, with 4.2 % reporting a maternal history of DM. Six hundred eighty-nine (1.3 %) reported a sibling with DM, among whom 7.9 % developed T2DM. Logistic regression, adjusted for age, gender, and baseline BMI, revealed an increased risk of T2DM with any family history (OR 1.79; 95%CI 1.57–2.04) though a maternal history (OR 1.89; 95%CI 1.57–2.28) was associated with more robust risk than a paternal history (OR 1.42; 95%CI 1.21–1.67); risk was unchanged with early age at parental diagnosis. A sibling with T2DM was most strongly associated with development of disease (OR 2.50; 95%CI 1.89–3.30), a risk further increased if the sibling was diagnosed at <50 years old (OR 3.07; 95%CI 2.20–4.27). Strength of association regarding sibling history remained intact even among those at normal weight after stratification by BMI.

CONCLUSIONS: Our data corroborate previous findings associating risk of T2DM with parental, especially maternal, DM history. In contrast to previous reports, however, personal risk of developing T2DM was more robustly associated with having a sibling with T2DM, compared to either parent. In contrast to parental history, which does not appear to be affected by age at diagnosis, T2DM risk increases substantially if the disease is diagnosed earlier in a siblings' life (prior to age 50). Adding virtually no further time to the already busy clinical encounter, asking about sibling, in addition to parental, family history may lead to more optimal identification of those at risk for T2DM.

SMOKING CESSATION INTERVENTIONS FOR URBAN HOSPITAL PATIENTS: A RANDOMIZED COMPARATIVE EFFECTIVENESS TRIAL Scott Sherman⁴; Alissa R. Link¹; Erin Rogers³; Paul Krebs^{3, 1}; Joseph A. Ladapo¹; Donna Shelley¹; Yixin Fang¹; Binhuan Wang²; Ellie Grossman¹. ¹NYU School of Medicine, New York, NY; ²New York University, New York, NY; ³VA NY Harbor Healthcare System, New York, NY; ⁴VA New York Harbor HCS, New York, NY. (Tracking ID #2198537)

BACKGROUND: Hospitalization is an under-appreciated window of opportunity to promote smoking cessation, particularly given a higher prevalence of smoking among hospitalized patients and the time of enforced abstinence and heightened vulnerability. Prior studies with hospitalized smokers have primarily been efficacy studies, with narrowly defined populations. We attempted to enroll every smoker admitted to two "safety net" hospitals into a post-discharge cessation intervention.

METHODS: We conducted a comparative effectiveness trial, as part of the NIH-funded Consortium of Hospitals Advancing Research on Tobacco (CHART). At two public hospitals in New York City (Bellevue Hospital Center and VA New York Harbor Healthcare System), we approached every person admitted who was identified as a smoker (based on admission notes). Inclusion criteria were: smoked cigarettes in the past 30 days; spoke English, Spanish, or Mandarin; had a U.S. phone number; not discharged to an institution where follow-up or smoking was limited (e.g., jail, nursing home); and not pregnant or breastfeeding. At discharge, participants were randomized to a) multi-session telephone counseling from study staff (*n*=804) or b) referral to the state Quitline for proactive outreach and counseling (*n*=814). We sent nicotine replacement therapy to participants who did not receive cessation medications on discharge. Our pre-specified primary outcome was self-reported abstinence (30-day point prevalence) at 6 months. For follow-up, we reached 69 % of participants at 2 months and 68 % at 6 months.

RESULTS: Of 18,797 patients identified as current smokers between July, 2011 and April, 2014, 3047 (16 %) were discharged before being approached, 3273 (17 %) were not current smokers, 4026 (21 %) had no US phone number, 2831 (15 %) were ineligible for other reasons and 3983 (21 %) refused participation. One thousand six hundred eighteen (9 %) participants enrolled in the study (71 % at Bellevue, 29 % at the VA). Approximately one quarter of participants were either homeless or in unstable housing, 60 % had a history of substance abuse or dependence, 43 % reported current hazardous drinking and half had a psychiatric diagnosis other than substance abuse. Including only patients reached for follow-up, the rate of abstinence was higher in the intensive counseling arm than the Quitline arm at 2 months (29.0 vs. 20.7 %; OR 1.56, 95 % CI 1.18–2.07) and 6 months (37.4 vs. 31.3 %; OR 1.31, 95 % CI 1.02–1.69). Results were similar using an intention to treat analysis. Participants in either arm who received at least one counseling call were much more likely to quit than participants who did not receive any calls (40.0 % vs. 26.5 %; OR 1.85, 95 % CI 1.41–2.42). This was not true for NRT—there was no difference in the abstinence rate between people who reported having used NRT and those who did not report using it.

CONCLUSIONS: At urban safety net hospitals, intensive counseling was more effective than referring to the state Quitline, but long-term abstinence was excellent in both groups. Many patients were not eligible for enrollment, despite minimal exclusion criteria. Either intervention would be feasible for any hospital.

SOCIAL NEEDS AND CARDIOVASCULAR RISK SCORES IN THE HEALTHY COMMUNITY NEIGHBORHOOD INITIATIVE—A COMMUNITY-ACADEMIC PARTNERSHIP IN SOUTH LOS ANGELES Arleen F. Brown³; D'Ann Morris⁶; Keith Norris¹; Katherine L. Kahn³; Ibrahima Sankare³; Keyonna M. King³; Roberto Vargas³; Aziza L. Wright²; Felicia U. Jones²; Homero del Pino⁷; Courtney Porter⁶; Dennishia Banner²; Rachelle Bross⁴; Nell Forge⁷; Orwilda L. Pitts⁷; Lujia Zhang⁵; Stefanie D. Vassar¹; Sitaram Vangala¹; Li-Jung Liang¹; Loretta Jones². ¹University of California Los Angeles Division of General Internal Medicine and Health Services Research, Los Angeles, CA; ²Healthy African American Families, Los Angeles, CA; ³UCLA, Los Angeles, CA; ⁴UCLA Clinical and Translational Science Institute, Harbor-UCLA Medical Center and Los Angeles Biomedical Research Institute, Torrance, CA; ⁵UCLA David Geffen School of Medicine, Los Angeles, CA; ⁶Los Angeles Urban League, Los Angeles, CA; ⁷Charles R. Drew University, Los Angeles, CA. (Tracking ID #2174127)

BACKGROUND: Behavioral, clinical, and public health efforts to improve awareness and management of cardiovascular disease (CVD) have had limited success in reducing disparities. Community-partnered participatory research (CPPR) to understand both clinical and social needs may result in more effective community-level risk reduction efforts.

The Healthy Community Neighborhood Initiative (HCNI) is a multifaceted community-initiated CPPR study to understand and reduce health and health care disparities in a bi-ethnic, under-resourced community in South Los Angeles.

METHODS: To better understand clinical needs, social needs, and available resources in the community, the HCNI developed and fielded protocols for in-home interviews (in English or Spanish) and clinical and laboratory examinations. The interview included questions about clinical characteristics, health status, health behaviors, use of health services, unmet need for social services, and neighborhood characteristics, including social cohesion. The service needs score was developed by the community partners, who identified modifiable social service needs that could be addressed by community agencies. The score was an unweighted sum of self-reported unmet needs related to childcare, employment, education, housing, neighborhood safety, emergency response, food sufficiency, legal advice, criminal justice, and health care. The social cohesion score, modified from the Project on Human Development in Chicago Neighborhoods, assessed the strength of social networks in the community. For each participant, we constructed 10-year 1) American College of Cardiology/American Heart Association and 2) Framingham CVD risk profiles. We constructed linear regression models for each log-transformed risk score, adjusted for age, sex, ethnicity, education, insurance, unmet social service needs, and social cohesion.

RESULTS: Of the 206 participants enrolled, 71 % were female and 29 % male, 75 % were African American and 25 % Latino, mean was age 44.6 years (SD=15.9), and 23 % had not graduated from high school. Participants reported a mean 3.4 (SD=2.8) unmet social service needs (range=0–10), rated neighborhood social cohesion a mean 2.6 (SD=0.7; range 1–5) and 38 % reported fair or poor health. Mean total cholesterol was 160 mg/dl (SD=35) for men and 178 mg/dl (SD=47) for women; mean HDL cholesterol was 49.8 mg/dl (SD=19.1) for men and 60.1 mg/dl (SD=17.4) for women; mean systolic blood pressure was 126 mmHg (SD=20) for men and 126 mmHg (SD=21) for women; and 24 % currently smoked, 23 % had hypertension treated with medications, and 14 % had a diagnosis of diabetes. In the multivariable analyses, for both CVD risk scores, older age, male sex, and each point on the unmet social service needs score were associated with higher CVD 10-year risk ($p<0.005$ for each). (Table)

CONCLUSIONS: Unmet need for social services, as defined by partners from community-based agencies, was associated with significantly higher 10-year risk (using both the Framingham and ACC/AHA equations) after adjustment for other traditional biologic and clinical risk factors. The HCNI community-academic partnership has developed an effective strategy for understanding modifiable clinical and social influences on CVD risk and will continue to collaborate to develop novel risk reduction interventions that are feasible and acceptable within this community.

Biologic and Social Influences on CVD Risk Scores—Multivariable Linear Regression Models*

Variable	Framingham (N=185): Adj		ACC/AHA (N=185): Adj	
	R ² =0.83		R ² =0.75	
	Estimate (SE)	P-Value	Estimate (SE)	P-Value
Age (years)	0.084 (0.003)	<0.0001	0.138 (0.006)	<0.0001
Male (v. Female)	0.567 (0.10)	<0.0001	1.42 (0.21)	<0.0001
Unmet Social Service Needs Score	0.045 (0.017)	0.0080	0.098 (0.035)	0.0054

* Not Significant: Ethnicity, education, insurance status, social cohesion score

SOCIOECONOMIC STATUS AND RISK OF HEMORRHAGE DURING WARFARIN THERAPY FOR ATRIAL FIBRILLATION: A POPULATION-BASED STUDY

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BACKGROUND: In patients prescribed warfarin therapy for atrial fibrillation, higher socioeconomic status is associated with superior anticoagulant control. However, the extent to which this influences the risk of hemorrhage is unknown.

METHODS: We conducted a population-based study of patients aged 66 years or older with atrial fibrillation who commenced treatment with warfarin between April 1, 1997 and March, 31 2012. We ascertained socioeconomic status using neighbourhood level income quintiles. We followed patients for up to five years of continuous warfarin therapy, censoring on the first of drug discontinuation, mortality, or the end of the study period. We used Cox proportional hazards models to identify the association between income and hospitalization for hemorrhage. In a secondary analysis, we examined the association between income and fatal hemorrhage.

RESULTS: Among 166,742 patients with atrial fibrillation who commenced treatment with warfarin, 16,371 (9.8 %) were hospitalized for hemorrhage. After extensive multivariable adjustment, we observed an association between risk of hemorrhage and socioeconomic status, with those in the lowest income quintile facing an increased risk relative to those in the highest quintile (adjusted hazard ratio [HR] 1.17; 95 % CI 1.12 to 1.23). We also observed an association between socioeconomic status and fatal hemorrhage, with an increased risk of death in those in the lowest income quintile relative to those in the highest quintile (adjusted HR 1.27; 95 % CI 1.10 to 1.47).

CONCLUSIONS: In patients who commence warfarin therapy for atrial fibrillation, lower socioeconomic status is a risk factor for hemorrhage and mortality from hemorrhage. This factor should be considered when initiating and monitoring warfarin therapy.

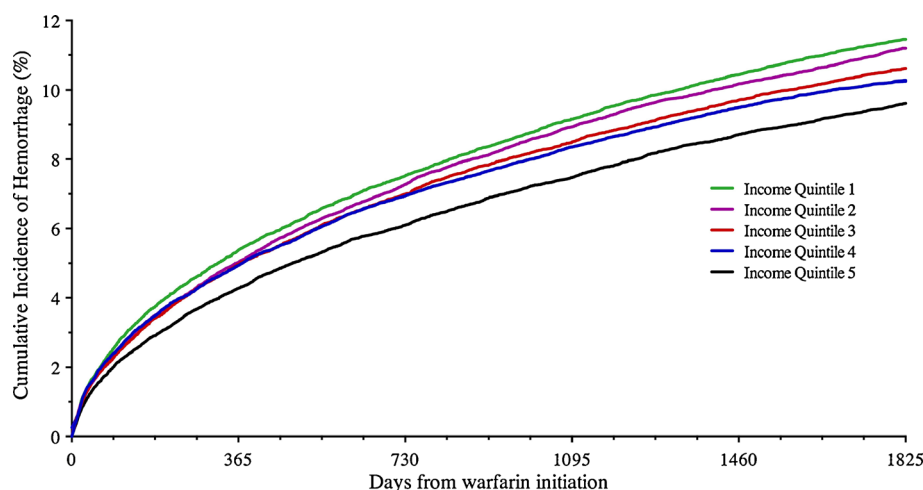


Figure 1. Cumulative incidence of hemorrhage over time, by income quintile

SPECIALIST AWARENESS OF THE VA PATIENT-CENTERED MEDICAL HOME Jessica L. Zuchowski³; Alexis K. Huynh³; Susan E. Stockdale³; Lisa S. Meredith²; Antonio E. Robles^{3, 6}; Philip Roos^{5, 6}; Lisa V. Rubenstein^{1, 2}; Kristina M. Cordasco^{4, 3}. ¹GLA VA, North Hills, CA; ²RAND Corporation, Santa Monica, CA; ³US Dept of Veterans Affairs, North Hills, CA; ⁴VA Greater Los Angeles Healthcare System/UCLA, Los Angeles, CA; ⁵VA Loma Linda Healthcare System, Loma Linda, CA; ⁶Loma Linda University, Loma Linda, CA. (Tracking ID #2196239)

BACKGROUND: The Patient-Centered Medical Home (PCMH) model is a dominant trend in US healthcare delivery. A major PCMH focus is care coordination between the medical home and the specialist “medical neighborhood”. In 2010, the VA began transforming its primary care services into the PCMH model, called Patient Aligned care Teams, or “PACT”. Little is known about VA specialists’ awareness of PACT. We measured specialist-reported familiarity with the PACT model and assessed variations in familiarity in relationship to specialist characteristics.

METHODS: We conducted an online cross sectional survey of all VA specialist providers in Southern California and Southern Nevada. We asked specialists: “PACT stands for Patient Aligned Care Teams and is being implemented in facilities throughout VA as part of VA’s national mandate for redesigning its healthcare system. How familiar are you with the PACT initiative described above?” Specialists responded using a 4-point Likert scale (“I have never heard of PACT apart from in this survey;” “I have heard of PACT, but am not very familiar with it;” “I am somewhat familiar with PACT;” “I am very familiar with PACT”). We stratified specialists by type (medical, surgical, mental health, and other specialists); whether or not the specialist reported having a primary focus on any specific patient population in their work (e.g., geriatrics, women’s health, HIV/AIDS, homeless); employment status (full time or part time); and number of years employed by VA. We examined specialists’ responses overall and within each stratum. All analyses were weighted for non-response and performed in SAS 9.3.

RESULTS: Of the 1530 specialists invited to participate, 380 (25 %) responded. Specialist familiarity with PACT varied by specialist group: of the four categories of specialists, mental health specialists were most familiar with PACT, and surgical specialists were least familiar (25 and 70 % reporting not very familiar or never heard of PACT, respectively; p-value <0.0001). Specialist familiarity with PACT varied by employment status: specialists who were employed by the VA full-time were most familiar with PACT and those employed by the VA part-time were least familiar (32 and 70 % reporting not very familiar or never heard of PACT, respectively; p-value <0.0001). There was a significant trend toward specialist familiarity with PACT varying by the presence of a primary focus on any patient population: specialists reporting any patient population focus in their work were more familiar with PACT than those without a population focus (30 and 45 % reporting not very familiar or never heard of PACT, respectively; p-value=0.0542). There were no significant differences in specialist familiarity with PACT by the average number of years working in the VA.

CONCLUSIONS: Specialist familiarity with PACT varied significantly by specialist group, employment status, and population-based focus. Full achievement of PCMH goals will require high levels of communication and care coordination between the PCMH and the VA medical neighborhood. These results suggest the need for a systematic approach toward engaging specialists in PACT, including efforts to specifically target: surgical specialists, part-time specialists, and specialists without any patient population focus for additional education and engagement with primary care.

SPECIALTY PHYSICIANS’ BELIEFS ABOUT MEDICAID PATIENTS Meredith A. Niess¹; Irene V. Blair²; Arthur Davidson^{3, 4}. ¹University of Colorado, Aurora, CO; ²University of Colorado Boulder, Boulder, CO; ³Denver Health, Denver, CO; ⁴University of Colorado School of Medicine, Aurora, CO. (Tracking ID #2190781)

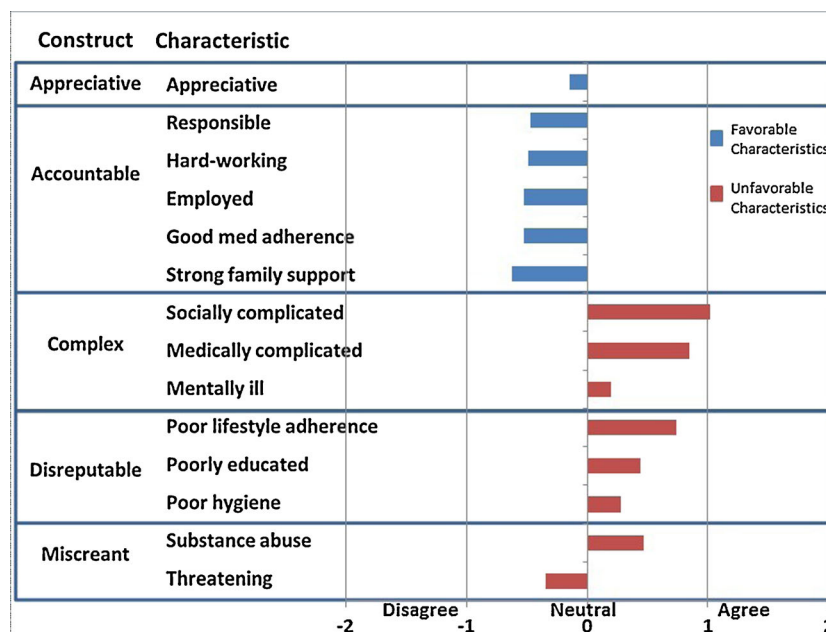
BACKGROUND: Medicaid is the largest health insurance provider in the United States, insuring more than 1 in 5 Americans annually. Nationally more than

30 % of office-based practices do not accept any Medicaid patients. Low acceptance of Medicaid is attributed nearly exclusively to inadequate reimbursement rates. Unfavorable perceptions about Medicaid patients may exacerbate this access gap, but are minimally described in existing literature. This survey of specialists describes their beliefs about Medicaid patients.

METHODS: We surveyed 1600 randomly selected Colorado Medical Society specialist members in April-June of 2014 via mail and email. Primary care physicians, hospitalists, pediatric specialists, and emergency physicians were excluded, along with retirees and trainees. Using a 5-point Likert-scale (strongly disagree to strongly agree) we assessed endorsement of 14 potential characteristics of “the typical adult Medicaid patient.” Our primary outcome was a composite belief score that combined respondent ratings such that a positive composite score=a favorable view of Medicaid patients and a negative score=an unfavorable view. We examined associations between the composite score and both respondent characteristics and their practice characteristics, retaining significantly associated variables in a multivariable regression model. Retained variables included years of practice experience, independent versus large employer practices, effect of productivity on individual income, and type of specialty practice. Using factor analysis, we identified distinct belief constructs underlying the clustering of respondents’ answers on the 14 characteristics. Our research team applied titles to these underlying belief constructs.

RESULTS: Eight hundred four of 1600 eligible physicians returned the survey with data on key variables, yielding a 50 % response rate. Respondents were predominantly male (74 %), white non-Hispanic (82 %), in practice for <20 years (53 %), and had ownership interest in their practice (72 %). Eighty-six percent of respondents had an unfavorable view of Medicaid patients on the composite belief score. Univariate analysis revealed significant associations between an unfavorable composite belief score and 10–20 years in practice, independent practice (versus large employer practice), higher income dependence on productivity, surgical or hospital-based specialty types (versus medical or ob/gyn), higher average specialty salary, and fewer Medicaid patients seen daily. In multivariable analysis, unfavorable beliefs remained significantly associated with independent practice, higher income dependence on productivity, and surgical or hospital-based specialty types. Factor analysis revealed 4 underlying constructs and a single item characteristic describing Medicaid patients: accountability, complexity, disreputability, miscreant, and appreciative (Figure 1). Respondents predominantly agreed with all unfavorable belief constructs and disagreed with all favorable belief constructs about Medicaid patients (Figure 2), consistent with the overall unfavorable beliefs found with the composite score.

CONCLUSIONS: Overall, specialty physicians in Colorado have an unfavorable view of Medicaid patients. These negative beliefs potentially affect both access to care and quality of care for Medicaid patients. Existing analysis of the Medicaid specialty access gap may oversimplify the cause as reimbursement. Policymakers may need to address negative beliefs about Medicaid patients to shrink the access gap.



Respondents’ description of a typical Medicaid patient.

	Belief Construct (from factor analysis)	% respondents agree	% respondents disagree	% neutral or non-response
Unfavorable	Complex	82%	8%	10%
	Disreputable	69%	13%	19%
	Miscreant	41%	31%	28%
Favorable	Accountable	13%	74%	13%
	Appreciative	28%	36%	37%

Respondent rates of agreement with belief constructs about Medicaid patients

SPECTRUM OF BREAST DISEASE AT RWANDA'S FIRST NATIONAL CANCER REFERRAL CENTER, JULY 2012-DECEMBER 2013 Lydia E. Pace¹; Jean-Marie Vianney Dusengimana³; Vedaste Hategekimana⁴; Hamissy Habineza³; Jean Bosco Bigirimana³; Neo Tapela^{1, 3}; Cadet Mutumbira⁴; Egide Mpanumusingo⁴; Nancy L. Keating^{2, 1}; Jane E. Brock¹; Susan Lester¹; Nzayisenga Ignace³; Deborah Dillon¹; Lawrence Shulman^{5, 1}; Tharcisse Mpunga⁴. ¹Brigham and Women's Hospital, Boston, MA; ²Harvard Medical School, Boston, MA; ³Partners in Health, Butaro, Rwanda; ⁴Ministry of Health, Butaro, Rwanda; ⁵Dana-Farber Cancer Institute, Boston, MA. (Tracking ID #2197897)

BACKGROUND: Programs to facilitate earlier diagnosis of breast cancer among patients with breast symptoms are urgently needed in low-and-middle-income-countries (LMICs). Understanding the presentations and distribution of breast diseases encountered in the early stage of a cancer program can guide clinical algorithms for evaluation of patients with breast concerns, and is important for resource allocation and quality improvement efforts. Prior to 2012, cancer services in Rwanda were extremely limited, and no facility had a breast clinic equipped to comprehensively evaluate and treat breast disease. We describe the spectrum of breast conditions evaluated in the breast clinic at Butaro Cancer Center of Excellence (BCCOE), Rwanda's first national cancer referral center, during its first 18 months.

METHODS: Using the electronic medical record, a list of all patients presenting with a breast concern to the oncology program's breast clinic from July 1, 2012-December 31, 2013, was compiled. We reviewed paper medical records to determine patients' evaluation and diagnosis. We excluded patients who had been diagnosed elsewhere with cancer and referred for management.

RESULTS: Among the 353 patients who presented with a breast concern during the 18 month study period, the median age was 41 (range 11–83) and 98 % were female. On exam, 289 (82 %) had a breast mass, 29 (8 %) had lymphadenopathy or another abnormality, 20 (6 %) had a normal exam, and 15 (4 %) had no initial exam documented. Biopsies were taken in 79 % of cases with abnormal exam findings. Among 168 breast cancers, 35 (21 %) were Stage I or II, 77 (46 %) were Stage III, and 51 (30 %) were Stage IV at diagnosis; for 5 (3 %), the stage was not documented. Among patients with a mass, 160 (55 %) had breast cancer, 105 (36 %) had benign disease, 6 (2 %) had non-breast cancers (including lymphoma and metastatic melanoma), and 18 (6 %) had no clearly documented diagnosis in the record. Among benign masses that were biopsied ($n=82$), proliferative mass-forming lesions including fibroadenomas were most common ($n=36$; 44 %), followed by non-proliferative mass-forming lesions ($n=19$; 23 %), inflammatory lesions ($n=9$; 11 %), changes related to pregnancy or lactation ($n=5$; 6 %), non-specific pathologic findings ($n=5$; 6 %), and normal breast tissue ($n=8$; 10 %). For half of patients with a documented mass but unknown diagnosis ($n=9$), biopsy was recommended but not performed or a pathology result was not found.

CONCLUSIONS: Following the opening of Rwanda's first national cancer referral center, more than half of patients presenting with an undiagnosed breast mass had breast

cancer, and most breast cancers were Stage III or IV at diagnosis. This is a much higher breast cancer detection rate than has been reported in other settings in Africa, though the breast cancer stage distribution is similar. As awareness of breast cancer and the availability of services increase, it will be important to monitor and describe changes in the relative proportions of benign and malignant disease at BCCOE, as well as the breast cancer stage distribution. Our findings will help inform innovative strategies in rural primary care facilities to allow efficient and effective evaluation and triage of women with breast complaints, assuring timely and earlier stage diagnoses.

STABILITY IN HEALTH LITERACY ASSESSMENTS OVER A THREE YEAR PERIOD AMONG OLDER ADULTS Laura M. Curtis; Rachel O'Connor; Michael S. Wolf. Northwestern University, Chicago, IL. (Tracking ID #2199184)

BACKGROUND: Numerous studies have found strong associations between older age and limited health literacy in cross-sectional analyses, suggesting age-related decline in the ability to manage one's health. However, few studies have examined health literacy performance prospectively, and not merely as a test-retest assessment of measures. We sought to examine changes in performance across time on the three most common health literacy measures and determine whether performance declines more rapidly after age 65.

METHODS: Adults between the ages of 55 and 74 receiving care at either an academic general internal medicine ambulatory care clinic or one of five federally qualified health centers in Chicago, Illinois were recruited for a National Institute of Aging study. Structured interviews including the Test of Functional Health Literacy (TOFHLA), the Rapid Estimate of Adult Literacy in Medicine (REALM), and the Newest Vital Sign (NVS) were completed by 560 patients at two time points 3.2 (SD=0.4) years apart. Changes in total scores from baseline to follow-up were calculated for each of the measures and decline was tested using paired t-tests. Differences in change scores were compared between participants who were less than 65 and 65+ at baseline using two-sample t-tests. Change scores were then modeled with age (<65 vs. 65+) as the main independent variable of interest, controlling for baseline health literacy score, gender, race, education, income, number of chronic conditions, and amount of time between interviews.

RESULTS: Participants had a mean (SD) age of 63(5.4) years at baseline, 69 % were female, 56 % White, and 38 % African American. Baseline literacy levels differed depending on the test, with 26 % having limited literacy on the TOFHLA (total score < 75), 22 % on the REALM (total score < 61), and 49 % on the NVS (total score < 4). Total scores decreased but not significantly for the TOFHLA (-0.22 (8.07), $p=0.53$) and NVS (-0.07 (1.38), $p=0.21$), while increasing slightly for the REALM (0.23 (3.29), $p=0.11$). TOFHLA scores did significantly decrease among participants age 65 and older at baseline (Mean change (SD) -1.14 (8.17), $p<0.05$) and differed significantly from those less than 65 (Mean change (SD) 0.33 (7.98), $p=0.04$). However, the two age groups performed similarly on the REALM and the NVS. In multivariable models, TOFHLA scores declined more significantly in those 65 and older compared to those less than 65 (β

−2.43, 95 % Confidence Interval (CI) −3.80, −1.06, $p=0.001$). No significant differences between the two age groups were found in literacy scores measured using the REALM or the NVS (β −0.11, 95 % CI −0.66, 0.44, $p=0.70$; β −0.21, 95 % CI −0.44, 0.02, $p=0.07$, respectively).

CONCLUSIONS: Performance on health literacy measures overall did not decline significantly during the 3 year follow-up period in this cohort, however participants over 65 years of age demonstrated significantly poorer performance on the TOFHLA. While the extent of decline may still be subtle, such detriment over time is similar to what has consistently been seen in older patients' fluid cognitive abilities. Future studies should further investigate with greater precision changes in health literacy among elderly persons. Such investigations could directly justify and inform the development of interventions that could mitigate decline in health literacy and subsequent self-management skills.

STAFF ROLES ON PRIMARY CARE TEAMS ARE FAILING TO ALIGN WITH PHYSICIANS' EXPECTATIONS AND NEEDS

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BACKGROUND: The VA has implemented a patient-centered medical home (PCMH) model called Patient Aligned Care Teams (PACT). In PACT, primary care staff including Registered Nurses (RNs), Licensed Practical Nurses (LPNs), Health Techs and Clerks are assigned to interdisciplinary working groups called "teamlets" which support a primary care provider (PCP) in caring for a consistent panel of patients. With the aim of shifting tasks off of PCPs, PACT staff roles have been expanded to include top-of-license tasks. We sought to identify challenges associated with this role expansion on PACT teamlets.

METHODS: We conducted interviews to assess the experiences of teamlet members during early PACT implementation. A strata sampling approach captured teamlet members in each of four PACT roles: PCPs (Physicians, Nurse Practitioners, and Physician Assistants), RNs, clinical associates including LPNs and Health Techs, and Clerks. With the aid of a semi structured interview guide we assessed 1) how teamlet members were informed about their PACT roles and responsibilities, and 2) how these roles affected professional dynamics in the teamlets. Interviews were recorded, transcribed, and analyzed using team-based, consensus-driven, content analysis techniques

RESULTS: Seventy-nine members of PACT teamlets from six VA clinics in Southern California including PCPs ($n=29$), RNs ($n=18$), LPNs ($n=20$), and clerks ($n=12$) participated in interviews. We identified three interdisciplinary coordination failures that inhibit non-PCP teamlet members from fully assuming the PACT roles and responsibilities that would best support their PCPs. First, we identified insufficient coordination between medicine (PCP) and nursing leadership about staff roles, with inconsistent understandings across leaders about the responsibilities of the non-PCP teamlet members (e.g., RNs). "Nursing leadership needs to talk to physician leadership—it's frustrating sometimes because my provider will come back from a meeting [with Physician Leadership] and we'll say we were told this by our nursing leadership and they [Providers] were told we would do something totally different [RN]. Second, we found that PCPs were not consistently informed about the parameters of the non-PCP teamlet members' roles, and therefore often asked these individuals to engage in tasks that were not approved by their direct line supervisors. "A nurse will say, "Well, I want to do this for you, but at the same time we were told we're really not supposed to do this for you." And so I [the PCP] say, "Well, I'm the physician here. I'm making a clinical decision. I tend to feel that I'm placing the RN or the LVN in a quandary in a sense that, okay, who do I follow, my nursing leader or my doctor." [PCP] This contributed to the third coordination failure, which was that the parameters set by non-PCP supervisors often did not align with the needs of the PCPs. PCPs expressed frustration that their needs were not being accommodated within the expanded non-PCP roles. "The issue here is defining the roles... frustration comes from the fact that they're [the nurses] are not getting laws or mandates from their leadership that would best suit physician's desires." [PCP]

CONCLUSIONS: PCPs need to be informed about the parameters of non-PCP staff roles as well as have a mechanism to provide input about the parameters. This would enable staff roles to better align with providers' expectations and needs. Implementing role changes for staff working on primary care teams requires interdisciplinary coordination. Our findings thus lend support to interdisciplinary leadership approaches to implementation of the primary care patient centered medical home.

STATIN-USERS' MORAL HAZARD IN DIET MAY BE AN AMERICAN PHENOMENON

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BACKGROUND: A recent report of US adults by Sugiyama et al. analysing NHANES data showed a significant increase in calorie and fat intake, as well as BMI, among statin users compared to nonusers¹. Hypothesizing that this moral hazard among statin users may be specific to the U.S., we analysed BMI change over time in statin users versus non-users in an apparently healthy Japanese screening population using longitudinal data.

METHODS: Data included all individuals presenting for health screening at St. Luke's International Hospital Center for Preventive Medicine (Tokyo, Japan) at least twice between 2005 and 2010. Patients were stratified into two groups based on self-reported statin use. Linear random effects models with random intercepts (initial BMI value), adjusted for age, gender, and statin use by year were used to derive parameters describing BMI progression.

RESULTS: Of 60,181 apparently healthy Japanese adults (mean baseline age, 46.8 years, SD 12; 49.5 %, female), 2368 patients were prescribed a statin on their first visit. Mean baseline BMI of statin users and non-users were 23.8 (SD 3.5) and 22.4 (SD 3.3), respectively. BMI decreased by an estimated 0.06 kg/m² (95 % CI: −0.07 to −0.04, $p<0.001$) per year among statin users, while only decreasing 0.007 kg/m² (95 % CI: −0.01 to −0.004, $p<0.001$) per year among non-users (Table 1).

CONCLUSIONS: Statin-users' moral hazard in diet appears to be absent in a Japanese health screening population. Where the phenomenon occurs, adoption of standardized screening programs that offer targeted patient intervention may be effective for promoting optimal behavioral changes to supplement pharmacotherapy.

Linear random effects models for yearly change in BMI, adjusted for age and gender

Statin non-users (N=2368)					
	Point estimate of coefficient	95 % CI of coefficient		p-value	
Yearly Change	−0.007	−0.01	−	−0.004	<0.001
Gender	−0.26	−2.61	−	−2.51	<0.001
Baseline age	0.18	0.17	−	0.19	<0.001
Baseline age-squared	−0.002	−0.002	−	−0.001	<0.001
Statin use	0.04	−0.004	−	0.075	0.075
Statin users (N=57813)					
	Point estimate of coefficient	95 % CI of coefficient		p-value	
Yearly Change	−0.06	−0.07	−	−0.04	< 0.001
Gender	−2.01	−2.33	−	−1.81	< 0.001
Baseline age	−0.10	−0.21	−	0.008	0.069
Baseline age-squared	0.0005	−0.00045	−	0.001	0.313
Statin use	0.10	0.03	−	0.18	0.006

STOP THE PRESSES? A SURVEY OF INFORMATION AND LEARNING PREFERENCES AMONG GENERAL INTERNISTS IN THE INFORMATION AGE

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BACKGROUND: General internists have a daunting task of keeping up with new medical advances given the rise in biomedical publications and the time demands of clinical practice. In addition to becoming aware of new research, they must also assess its applicability to patient care in their practice. Clinical colleagues can one another with information and appraisals of new data, which may be helpful for physicians in sifting through medical publications. In the modern Internet era, online social networks may help physicians filter information relevant to their practice based upon what their peers are reading and recommending. However, social networks may be relatively 'noisy' and inundate physicians with irrelevant information. With the goal of improving the delivery of high-value information to physicians and as part of an AHRQ grant to the Society of General Internal Medicine (SGIM), we sought to understand how general internists gather and appraise information, and their preferred information channels.

METHODS: This was a cross-sectional survey of the physician membership ($n=3619$) of SGIM from March to December, 2014. We asked physicians about their confidence in staying abreast of new medical information, their strategies for ongoing learning, their preferred information channels, and what steps are necessary before they adopt new information into practice. We stratified based on training status, specialty, and self-reported technology adoption tendencies. Respondents were asked how they would like to receive information in a free-text question, and responses were coded. Differences in continuous variables were assessed by Wilcoxon Rank-Sum tests and in categorical variables by Chi-Square tests.

RESULTS: Four hundred seventy-eight physicians responded for an estimated response rate of 13 %. Attending physicians represented 82 % of respondents, while trainees represented 18 %. Seventy percent of physicians reported finding it difficult to keep up with new medical information, though 92 % make deliberate efforts to stay up to date. Topical reviews of information, professional conferences, and conversations with peers were the most highly rated sources of information (table). E-mail is still a common way physicians wish to be alerted of new practice-changing information, with 52 % of respondents mentioning e-mail within their free-text response. Professional conferences and practice peers were valuable sources of information. Most avoided online social networks for information, though trainees rated slightly them more preferable than did attending physicians. For reading information in depth, attending and training physicians preferred printed journals/articles over computer-based web browsers, mobile phones and tablets. However, early adopters of technology marginally

preferred web over print (37 vs 36 %). Before deciding to change their practice, physicians preferred to have guidelines, and 52 % of trainees ranked these as most important factor (mean rank 1.8/5) when adopting new knowledge compared with 36 % of attendings (mean rank 2.1) ($p<0.01$). However, many also wished to review the primary article (mean rank 2.6 and 2.3 for trainees and attending respectively, $p=0.06$).

CONCLUSIONS: Despite regular efforts to stay apprised of new medical information, most general internists in this sample found it difficult to keep up. Reliance on guidelines, topic updates, and e-mail alerts may signify an increasing reliance on pre-digested data in this fast-paced information age. Interestingly, print was the most highly ranked medium for reading in-depth overall, and a very close second to the web among early adopters of technology. Generalists were not fond of either professional or personal online social networks for learning about new information, despite placing a high value on their "offline" social networks. This may be due to either a separation of work/personal personae online, an unfavorable signal to noise ratio, or other factors. Interventions that provide synopses and context to busy generalists, with links to the primary articles, may help better disseminate new knowledge. Despite the increasing trend for journals to abandon print media, print media is considered the most best source for in-depth reading. Engaging peers and reputable colleagues in spreading this information may be synergistic. These insights will be used to design an intervention to improve delivery of medical information to SGIM members.

Channel	Overall Mean (sd)	Trainees (sd)	Attendings (sd)	pvalue diff
Topic Reviews	4.28 (0.79)	4.43 (0.71)	4.27 (0.79)	p= 0.063
Professional Conference	4.03(0.71)	4.1 (0.68)	4.01 (0.72)	p= 0.35
Peers In My Practice	4.02(0.66)	4.2 (0.67)	3.97 (0.66)	p= 0.002
Journal Review Sites	3.88(0.95)	3.92(0.95)	3.89 (0.94)	p= 0.828
Email TOC	3.72(0.92)	3.58 (0.77)	3.76 (0.95)	p= 0.063
Print	3.59(0.96)	3.59 (0.97)	3.47 (0.87)	p= 0.148
Automatic Citation Alerts	2.89(0.95)	2.92 (1)	2.87 (0.94)	p= 0.89
Major News Outlets	3.17(0.9)	3.25 (0.88)	3.16 (0.89)	p= 0.37
News Aggregators	2.44(0.85)	2.77 (0.91)	2.37 (0.8)	p= 0.001
Mobile News Aggregators	2.21(0.82)	2.58 (0.89)	2.12 (0.78)	p< 0.001
Professional Social Networks	2.48(0.96)	2.87 (1.04)	2.39 (0.91)	p= 0.001
Twitter	2.2(1.16)	2.55 (1.19)	2.11 (1.14)	p= 0.005
LinkedIn	2(0.9)	2.38 (0.99)	1.92 (0.85)	p= 0.001
Facebook	1.88(0.94)	2.22 (1.05)	1.81 (0.9)	p= 0.003

Preference ratings among physicians, from 1 (strongly avoid) to 5 (strongly prefer)

STRENGTHENING INFORMATION EXCHANGES IN RESIDENT SIGN-OUTS: THE ROLES OF RESPONSIBILITY AND ACCOUNTABILITY Soo Hoon Lee^{3, 1}; Dale A. Fisher²; Wei-Ping Goh⁴; Heidi Mah⁴; Phillip Phan^{1, 2}. ¹Johns Hopkins University, Baltimore, MD; ²Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore; ³Old Dominion University, Norfolk, VA; ⁴National University Hospital, Singapore, Singapore. (Tracking ID #2192647)

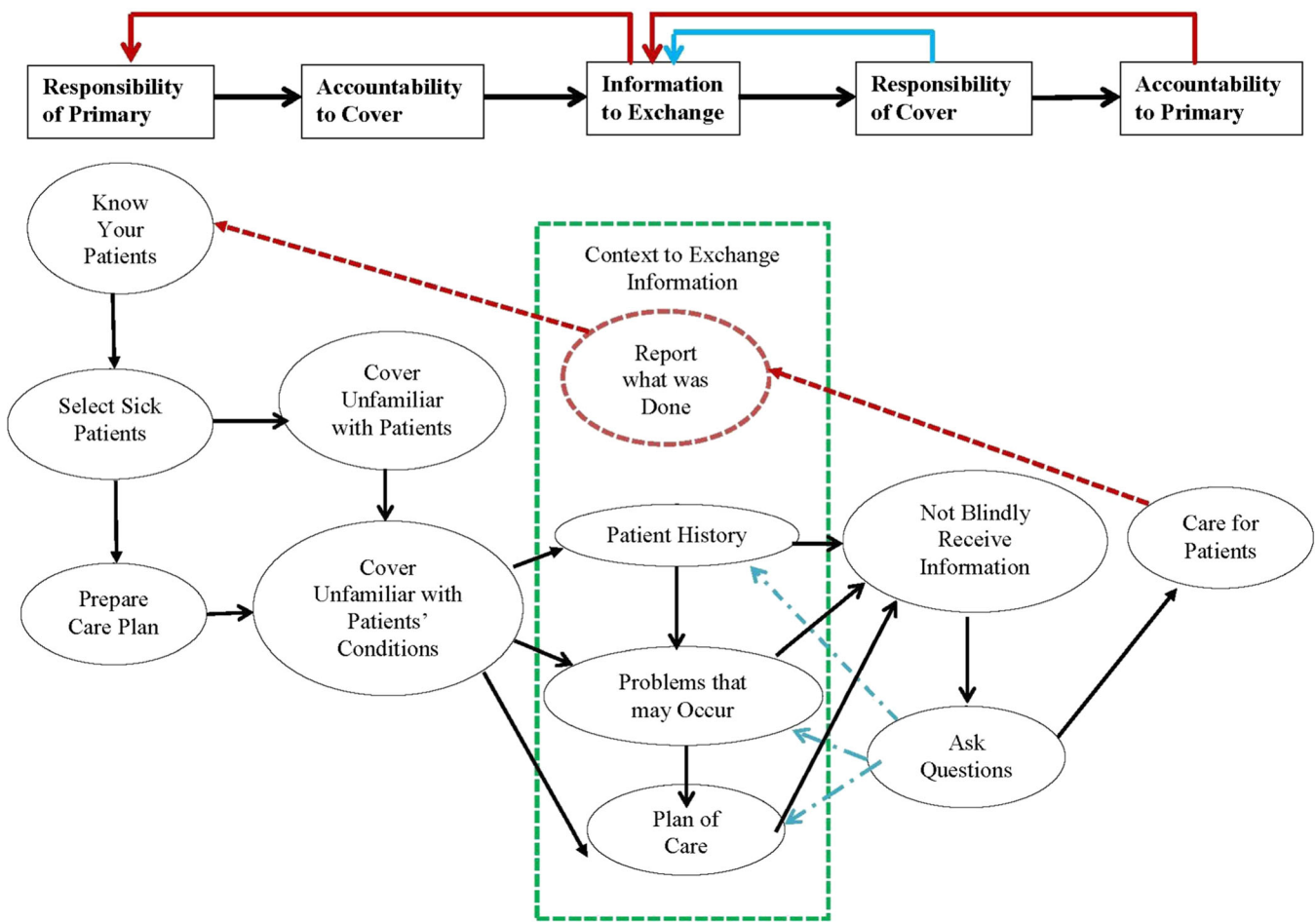
BACKGROUND: Sign-out is critical to the transition of patient care between shifts. The literature on sign-outs focuses on information exchange with little attention to other dimensions, such as the transfer of responsibility and accountability. We hypothesize that a process view linking the transfer of responsibility and accountability to information exchange is better for understanding how sign-outs relate to clinical outcomes.

METHODS: Design. A qualitative study using one-on-one semi-structured interviews, archival data, and observations. Setting. A 1100-bed tertiary academic hospital in Singapore. Prior to November 2011, sign-outs to six night coverage residents were ad hoc. Eight sentinel events between 2008 and 2010 identified sign-outs as a root cause of risk, leading to a 2.5-day Rapid Improvement Event on sign-outs in November 2011 with staff participation from every level and department. Intervention. A formal sign-out protocol with a minimum data set for information exchange, protected time and location, senior physician supervision, and prioritization of patients by acuity (tiering) for type of sign-out (face-to-face, phone, text, or none by decreasing levels of acuity). Data. In

December 2012, we conducted 60-min interviews with residents, registrars, a clinical director, and a hospital vice-president from General Medicine, Pediatrics, Cardiology, and Anesthesiology. We followed up with archival data and direct observations to validate the interview information. In June 2013, we conducted a second round of interviews to track protocol implementation. Analysis. We analyzed audio-taped interview transcripts according to guidelines by Strauss and Corbin (1990). We used in-vivo open coding to identify and categorize initial concepts in the data. We used axial coding to identify second order themes from the first order conceptual categories. We then extracted overarching dimensions by grouping the second order themes. We did this iteratively, using different starting points in the data until we reached theoretical saturation, to ensure convergence.

RESULTS: While the formal sign-out protocol facilitated efficient information exchange, primary residents took personal responsibility to identify high-risk patients that needed vigilance at night and held themselves accountable to provide thoughtful plans of care to night coverage residents in order to facilitate the tiering decision. In turn, night coverage residents took personal responsibility to ask questions about the plans of care since they had not previously seen those patients. Figure 1 illustrates the structure of the data.

CONCLUSIONS: Until a more efficient (e.g., electronic) handover system is established to facilitate sign-outs for large numbers of patients to a small team of night coverage, tiering patients seemed an optimal method to increase patient safety at night. This system fostered a formal process of information exchange that gave rise to explicit two-way transfers of responsibility and accountability between primary and coverage residents. The net result was increased confidence of night coverage residents to care for patients at night.



STRIVING TOWARD TEAM-BASED CONTINUITY: COVERAGE ARRANGEMENTS IN VHA ACADEMIC PRIMARY CARE CLINICS AND IMPLICATIONS FOR MEDICAL HOME URGENT ACCESS AND CONTINUITY METRICS Jane Forman²; Claire H. Robinson¹. ¹VA Ann Arbor Health Care System, Ann Arbor, MI; ²VA HSR&D, Ann Arbor, MI. (Tracking ID #2199898)

BACKGROUND: Improving timely access to primary care while maintaining continuity with the patient's primary care provider (PCP) is an important goal of patient-centered medical homes (PCMH). In the Department of Veterans Affairs (VA) medical home initiative, Patient Aligned Care Teams (PACT), care is provided by a dedicated team, including PCPs, nurses, and administrative staff. To promote quality improvement, VA has set key metrics for same-day visit requests with the patient's assigned PCP (access), and the proportion of visits completed with the patient's assigned PCP (continuity). One hundred twenty of approximately 900 VHA primary care clinics are located in academically-affiliated medical centers, and have a dual mission of providing patient care and training resident PCPs in the medical home model. Because all resident PCPs (and many staff PCPs) in academic clinics are available to provide clinical care on a part-time basis, these clinics must provide coverage for their patients when they are not in clinic, and face special challenges in meeting metrics based on in-person visits with the patient's assigned PCP compared to smaller, community-based non-academic clinics. There has been no national study to date aimed at understanding how academic primary care clinics provide coverage for same-day requests when a patient's resident PCP is not in clinic, and implications for access and continuity and its measurement.

METHODS: As part of a multi-site quality improvement project, we conducted semi-structured telephone interviews with members of Primary Care clinic leadership involved with residency programs at 19 VHA academic medical centers across 16 of 21 Veterans Integrated Service Networks (VISNs). Interviews took place from December 2013

through October 2014 and lasted approximately 1 h. All interviews were audio recorded and transcribed verbatim. Participation in the project was completely voluntary. We created comprehensive, structured summaries from the interview transcripts, and conducted matrix analysis to identify themes and patterns across sites. We used NVivo v.10 to organize and manage our data.

RESULTS: Almost all sites took a team-based approach to coverage for same-day visit requests, usually prioritizing either the absent resident's attending PCP or another resident of that attending (both of which count toward meeting the continuity metric), then another resident or PCP on the same team, then any resident or PCP, either on another team or in a walk-in/urgent care clinic. The degree of formality and organization of coverage arrangements varied, from having a detailed algorithm for schedulers in the electronic scheduling system to simply hoping a team resident would be available. Success with implementing team-based urgent access depended on the predictability of resident and attending schedules, ability to have attendings and their residents in clinic at the same time, availability of open visit slots, and scheduler knowledge of preferred coverage arrangements. University affiliates largely controlled resident schedules, and coverage was generally more complex at sites with part-time attendings who had their own patient panels. Successful coverage arrangements that promoted both continuity of care and teaching missions included resident "micro-PACTs" with dedicated RN, LPN, and clerk staff, creating multidisciplinary practice partner triads, pairing up residents on opposite ambulatory and inpatient blocks, and having mid-level providers as part of the team and coverage algorithm. Most interviewees said academic clinic could not meet metrics as currently designed; however, some sites reported that the metrics had had some positive consequences, such as scheduling residents and their attendings to be in clinic together more often. Sites uniformly recommended a transition to team-based urgent access and continuity metrics that provided more flexibility in defining a team. Some sites emphasized inclusion of groups of residents and attendings, almost all sites would include RNs, and one site would include extended team members such as clinical pharmacists. Team-based

metrics were thought to be a better fit with on-the-ground efforts to provide urgent access and continuity, to incentivize team-based care as envisioned in the PACT model, and to improve resident training in team-based care.

CONCLUSIONS: Team-based urgent access and continuity metrics are currently being developed by VA, and may encourage creative coverage arrangements in academic clinics that improve continuity and care quality, and that are more congruent with the interdisciplinary team-based care at the heart of the PCMH model. Designers of PCMH performance measures should take into account the constraints imposed on academic clinics by residency programs, and allow the flexibility that these clinics need to both meet patient-centered care goals and provide rich trainee education in continuous team-based care.

STRONGER ALCOHOL POLICIES LINKED TO LOWER ALCOHOLIC CIRRHOSIS MORTALITY RATES IN THE UNITED STATES Scott E. Hadland^{1, 2}; Ziming Xuan³; Jason G. Blanchette³; Timothy Heeren³; Timothy S. Naimi^{4, 3}. ¹Boston Children's Hospital, Boston, MA; ²Harvard Medical School, Boston, MA; ³Boston University School of Public Health, Boston, MA; ⁴Boston University School of Medicine, Boston, MA. (Tracking ID #2193589)

BACKGROUND: Stronger alcohol policies have been linked to decreased alcohol consumption and binge drinking in the United States. We examined the relationship between the strength of states' alcohol policies and alcoholic cirrhosis mortality rates.

METHODS: To quantify the alcohol policy environment in each state, we used the Alcohol Policy Scale (APS), a validated assessment of alcohol policies across 50 states and Washington DC. The APS combined ratings on the efficacy and implementation of 29 policies nominated by a Delphi panel of policy experts from a range of disciplines, including law, epidemiology, psychology, sociology, and economics. Examples of policies incorporated into a state's APS score included alcohol taxes, retail price restrictions, and hours of sales regulations, among other policies. The theoretical range of the APS score

was 0 to 100, with high APS scores representing strong alcohol policy environments. State-level APS scores for each year between 1999 and 2008 were related to age-adjusted alcoholic cirrhosis death rates obtained from the US Centers for Disease Control and Prevention for each year between 2002 and 2011, based on a 3-year lag between policies and their associated mortality rates. We used Poisson regression with robust sandwich standard error estimates to account for state-level clustering. We also stratified analyses by census region to examine geographical differences in the association between APS and mortality. Analyses adjusted for state-level race/ethnicity, college education, insurance status, household income, religiosity, policing rates, and level of urbanization.

RESULTS: Across states from 1999 to 2008, the mean APS score was 41 (range, 23 to 66), and increased over the study period (mean APS in 1999, 38; mean APS in 2008, 42; $p < 0.001$). The mean age-adjusted alcoholic cirrhosis mortality rate across the US from 2002 to 2011 was 4.7 deaths per 100,000 per year (95 % confidence interval [CI], 4.2–5.3) with a range of 2.5 (Pennsylvania) to 10.3 (New Mexico). Alcoholic cirrhosis mortality rates were associated with the proportion of individuals of American Indian / Alaska Native ancestry in a state ($r^2 = 0.319$; $p < 0.001$). Overall, higher APS scores were significantly associated with lower alcoholic cirrhosis mortality among the entire population (adjusted incidence rate ratio [IRR], 0.89 per 10-point increase in APS score; 95 % CI, 0.82–0.97), and among females (adjusted IRR, 0.82; 95 % CI, 0.82–0.97) but not males (adjusted IRR, 0.94; 95 % CI, 0.87–1.01). However, significant variation was found by geographical region: for females, higher APS scores were significantly associated with lower mortality in the Northeast geographical census region (adjusted IRR, 0.39; 95 % CI, 0.25–0.61) but not in the Midwest, South, or West; for males, higher APS scores were significantly associated with lower mortality in the Northeast (adjusted IRR, 0.71; 95 % CI, 0.60–0.84) and the West (adjusted IRR, 0.83; 95 % CI, 0.70–0.99), but not in the Midwest or South.

CONCLUSIONS: Stronger state-level alcohol policy environments are associated with lower alcoholic cirrhosis mortality. Future studies should scrutinize this relationship to determine the direction of causality of this relationship, and delineate which alcohol policies are most protective.

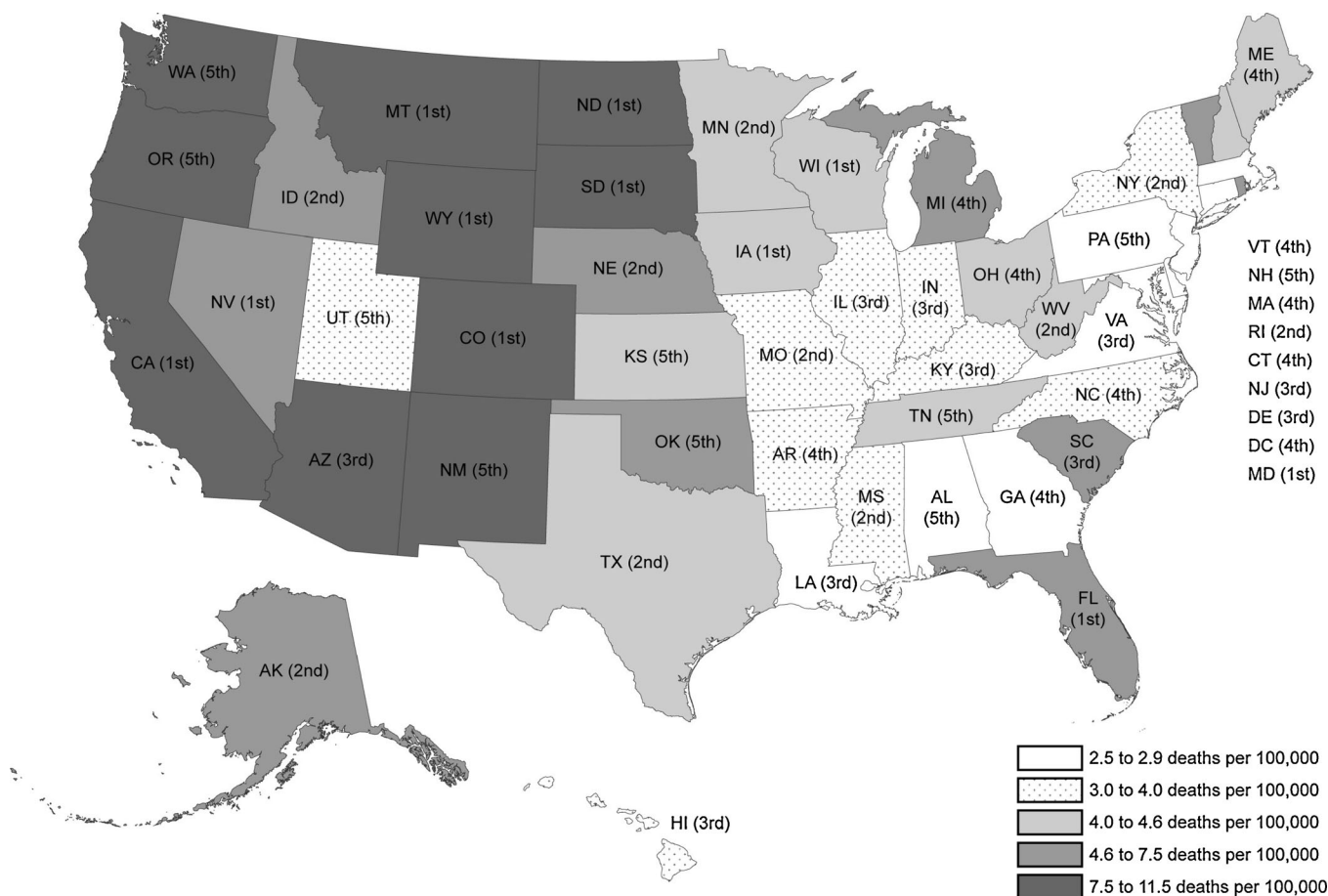


FIGURE: Overall state age-adjusted alcoholic cirrhosis mortality rates and associated alcohol policy scale (APS) score quintiles. Mortality rates are from 2010 to 2011 and alcohol policy scale scores are from 2008 to introduce a 3-year lag between APS score and associated mortality. Darker shading indicates higher mortality, as indicated in the legend. The 1st quintile corresponds to the lowest APS scores (weakest policy environments); 5th quintile, the highest (strongest policy environments).

SUBSTANCE USE IN A POPULATION-BASED SAMPLE OF OLDER HOMELESS ADULTS Matthew A. Spinelli¹; Claudia Ponath¹; Lina Tieu¹; Emily E. Hurstak¹; David Guzman¹; Margot Kushel¹ University of California, San Francisco, San Francisco, CA. (Tracking ID #2190894)

BACKGROUND: The median age of the homeless population is rising, with half of homeless adults 50 and older. Homeless adults have higher rates of substance use disorders (SUDs) than non-homeless adults, but, in the general population, rates of SUD decrease with age. Rates of SUD in older homeless adults have not been well described.

METHODS: We conducted purposive population-based sampling of homeless individuals aged 50 and older in Oakland, CA from homeless encampments and recycling centers, homeless shelters and low-cost meal programs ($n=350$). Inclusion criteria included: English speaking, age 50 or over, homeless at recruitment based on the Homeless Emergency Assistance and Rapid Transition to Housing (HEARTH) criteria, and able to give informed consent. An initial interview included questions about demographics, health status, substance use and alcohol use and treatment. We used questions derived from the Addiction Severity Index (ASI) to capture lifetime use, and the WHO's Alcohol Use Disorders Identification Test (AUDIT) and the WHO's Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) to measure current use. We measured depression using the Center for Epidemiologic Studies Depression Scale (CES-D; score ≥ 15) and for PTSD the Primary Care PTSD Screen (PC-PTSD; score ≥ 50). We used descriptive statistics to analyze substance use.

RESULTS: Among 350 participants, 77.1 % were male, 29.1 % were ages 50–54, 33.4 % were ages 55–59, 25.4 % were ages 60–64 and 12.0 % were ages 65 and older. The majority (79.7 %) was African-American, 10.9 % were non-Hispanic white and 4.6 % were Hispanic. Depression and PTSD were present in 53.3 and 32.6 % respectively. Over half (55.1 %) reported fair or poor health. In the 180 days prior to interview, 46 % were principally unsheltered, 25.1 % used shelters, 16.3 % lived unstably with family and friends, and 12.3 % were recently homeless. At-risk cocaine use was more common among African Americans, with 48.0 % having at-risk use compared to 21.0 % of non-Hispanic whites ($p=0.001$), while at-risk amphetamine use was more common among non-Hispanic whites, with 31.6 % having at-risk use compared to 4.3 % of African Americans ($p<0.0001$). Men were more likely than women to have at-risk alcohol use, 28.0 % versus 16.2 % ($p=0.03$). At-risk illicit drug use declined by age group, with 77.5 %, 59.8 %, 60.7 %, and 54.8 % reporting at-risk use for ages 50–54, 55–59, 60–64 and 65+ respectively ($p=0.005$). At-risk alcohol use did not demonstrate a statistically significant decline. Fewer than a third (31.1 %) of participants with current at-risk alcohol use had ever accessed treatment, while 51.8 % of participants with current at-risk non-alcohol drug use had ever received treatment.

CONCLUSIONS: Despite the older age distribution, substance use disorders (SUDs) are common among older homeless adults, with proportions similar to those seen in previous studies of the overall homeless population. We found that rates of at-risk illicit substance use were lower with increasing age in our sample, which could reflect a survival effect or changing behavioral patterns with advancing age. In contrast, rates of alcohol use remained high throughout all age strata we studied. This may reflect the overall poor access to alcohol treatment observed in our sample. Despite the aging of the population, SUDs remain a key health concern in homeless populations. Substance use treatment programs should take into account the needs of older homeless individuals, who may face additional barriers to treatment and health risks of continued use.

At-risk substance use

Substance	Current at-risk use % (moderate or greater severity)
Alcohol	25.8
Any illicit drug	64.6
Cocaine	43.1
Opioid	12.9
Amphetamine	8.0
Cannabis	39.1
Sedative	2.5
Hallucinogen	1.4
Inhalant	1.2

SUSPICION OF CANCER CLINIC: A POTENTIAL MODEL FOR FACILITATING OUTPATIENT CANCER DIAGNOSIS IN UNDERSERVED PATIENT Safina Hossain²; Amir Mehrvarz Sarshekah¹; Sarah Mougalian⁴; Meghan Karuturi³; Alex Zarzour³; Alyssa Rieber³; Jennifer Swails¹. ¹University of Texas at Houston, Houston, TX; ²University of Texas at Houston, League City, TX; ³MD Anderson Cancer Center, Houston, TX; ⁴Yale School of Medicine, New Haven, CT. (Tracking ID #2199182)

BACKGROUND: Patients with concerning findings for malignancy experience significant stress while awaiting final diagnosis, and delayed diagnosis may contribute to disparities in cancer survival among underserved patients. Innovative practice models aimed at these high-risk patients may improve clinical outcomes and reduce cost. The suspicion of cancer clinic (SOCC) was started in May 2013 to address this need after data showed that average time to outpatient diagnosis of a new malignancy within our system was 70 days, with 94 days until the first oncology appointment. Excess cost to the system from unnecessary hospitalization and ER visits was estimated at \$723,445 over 20 weeks. One year after implementation of the clinic, we aimed to determine whether this specialized outpatient suspicion of cancer clinic expedited evaluation in patients eventually diagnosed with cancer.

METHODS: This retrospective chart review was conducted on 100 patients between November 2013 and December 2014 at the Lyndon Baines Johnson (LBJ) Hospital SOCC and compared to a historical control group of 104 patients diagnosed with cancer in 2011. Time, in days, from presentation with abnormal signs and symptoms to evaluation at LBJ medical oncology clinic was measured. Patients with cancer diagnosed at an outside hospital, previously diagnosed cancer within HCHD, or with no established diagnosis at time of chart review were excluded from final data analysis.

RESULTS: After exclusion criteria were applied, 42 patients in the SOCC group and 56 patients in the control group were included in the analysis. Most patients were excluded due to diagnosis outside of our healthcare system. The SOCC decreased the mean time from presentation to oncology appointment by 42 days ($P=0.001$, 95 % CI 16.2 to 69.9). The groups differed significantly with respect to the type of cancer diagnosed. SOCC patient primarily had lung (21.4 %) and upper GI (14.3 %) malignancy, but the control group was primarily composed of breast cancer (32.1 %) and colorectal cancer (19.6 %).

CONCLUSIONS: The SOCC significantly reduced time from presentation to oncology appointment compared to a historical control group in the Harris County Health District. A potential confounder is the differing proportions of each cancer between the groups (e.g., higher proportion of breast cancer diagnosis in the control group). Benefits that could be derived from expediting the process of cancer diagnosis in the outpatient setting include earlier stage of cancer diagnosis, earlier treatment initiation, reduction in healthcare disparities and cost reduction in cancer diagnosis. Similar studies of a larger size are needed to further validate the benefit of such a specialized clinic, as well as cost-effectiveness studies.

SUSTAINABILITY OF A TAILORED BEHAVIORAL INTERVENTION TO IMPROVE HYPERTENSION CONTROL: OUTCOMES OF A RANDOMIZED CONTROLLED TRIAL Maria Antonia Rodriguez²; Jennifer P. Friedberg³; Binhuan Wang¹; Yixin Fang¹; Sundar Natarajan^{2, 1}. ¹New York University, New York, NY; ²VA New York Harbor Healthcare System, New York City, NY; ³VA New York Harbor Healthcare System, New York, NY. (Tracking ID #2201363)

BACKGROUND: The efficacy of blood pressure (BP) lowering through medication, diet, and exercise is established. Recent national guidelines recommended blood pressure (BP) control goals of systolic BP [SBP] <130 mm Hg and diastolic BP [DBP] <80 mm Hg in diabetes or kidney disease, or SBP <140 mm Hg and DBP <90 mm Hg in all others. However, a substantial proportion of patients with hypertension continue to have uncontrolled BP. While behavioral interventions can lower BP, little is known about their sustainability when the intervention ends. We previously reported on the effect of a tailored behavioral intervention to lower BP at 6 months. Here, we report on a key prespecified goal, assessing sustainability of the intervention at 12 months, i.e., 6 months after stopping the intervention.

METHODS: We conducted a three-arm, randomized controlled trial to evaluate the effectiveness of two active interventions, 1) a tailored stage-matched intervention (SMI) based on the Transtheoretical Model and 2) a non-tailored health education intervention (HEI) to improve BP control through six monthly telephone calls focusing on diet, exercise and medication adherence. Each was compared to a usual care (UC) group where participants did not receive phone counseling. Participants were Veterans with repeated uncontrolled BP, despite antihypertensive drug treatment for ≥ 6 months. BP measurements were taken at baseline, 6 months (immediately after the intervention period) and 12 months (6 months post-intervention). Generalized estimating equations (GEE) with logistic link function was fitted to analyze the repeated BP measures (at both 6 months and 12 months), adjusting for baseline BP control. Similarly, GEE was used to analyze the continuous SBP measurement with repeated measurements at both 6-month and 12-month, adjusting for baseline SBP. These GEE analyses utilized all available data, taking into account the correlations among

repeated measures. Finally, McNemar test was applied to evaluate the null hypothesis of no change in BP control from baseline to 12 months within each arm, ie, if the proportion of participants with BP under control from baseline to 12 months changed within SMI, HEI, and UC, respectively.

RESULTS: We enrolled and randomized 533 participants with repeated uncontrolled BP into the SMI, HEI and UC groups. There were no differences between groups at baseline. At 12-month follow-up, the proportion of SMI, HEI and UC with BP under control were 61.84 %, 60.13 %, and 52.23 %. Compared to UC, SMI participants were 1.8 times more likely to have BP under control between 6 and 12 months (OR 1.8, 95 % CI: 1.27, 2.66), and HEI participants were 1.5 times more likely to have BP under control (95 % CI: 1.01, 2.12). The adjusted analyses for SBP levels indicate that the mean effect of SMI was 2.80 mmHg (95 % CI: -5.33, -0.26) lower than UC ($p=0.0306$), while the mean effect of HEI compared with UC was 2.56 mmHg (95 % CI: -5.54, +0.42,) lower ($p=0.0918$). To evaluate the robustness of our findings, we tested the null hypothesis of no change in BP control from baseline to 12 months within each arm and found that there was 19.23 % improvement in the proportion with controlled BP for SMI ($p<.0001$), 19.57 % for HEI ($p<.0001$) and 7.60 % for UC ($p=.15$).

CONCLUSIONS: We found that both a telephone-delivered tailored SMI and a non-tailored HEI resulted in improved BP control at 12 months, with SMI having a greater proportion under control. SMI also led to a significant lowering in SBP at 12 months while HEI led to a non-significant lowering in SBP. Depending on needs and resources available, decision makers can choose either SMI or HEI to improve BP control rates of patients with repeated uncontrolled hypertension. This could be an important new approach to improve BP control, particularly in settings where Telehealth or Patient Centered Medical Home is being implemented.

SYSTEMATIC REVIEW AND META-ANALYSIS OF INHALED TOXICANTS FROM WATERPIPE AND CIGARETTE SMOKING Brian A. Primack¹; Mary Carroll²; Patricia M. Weiss¹; Alan Shihadeh⁴; Ariel Shensa¹; Steven Farley¹; Michael J. Fine²; Thomas Eissenberg⁶; Smita Nayak⁵. ¹University of Pittsburgh, Pittsburgh, PA; ²VA Pittsburgh Healthcare System, Pittsburgh, PA; ³Squirrel Hill Health Center, Pittsburgh, PA; ⁴American University of Beirut, Beirut, Lebanon; ⁵Swedish Center for Research and Innovation, Seattle, WA; ⁶Virginia Commonwealth University, Richmond, VA. (*Tracking ID #2198875*)

BACKGROUND: Waterpipe tobacco smoking (WTS) is an emerging trend worldwide. In the US, usage rates are increasing not only among youth and college students but also among adults in the greater community. Because up to half of WTS users do not use other forms of tobacco, it exposes many individuals who may otherwise not have been exposed to tobacco combustion products. Although waterpipe tobacco smoke is known to contain many toxicants found in cigarette smoke, such as tar, nicotine, and carbon monoxide (CO), estimates vary as to the relative smoke volumes and toxicant loads. Therefore, to inform clinical education, interventional programming, and public health policy, we conducted a systematic review and meta-analysis to provide pooled estimates of relative toxicant exposures for WTS compared with cigarette smoking.

METHODS: We designed and reported this study using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). We included all studies that: (1) reported a controlled laboratory or natural environment study designed to mimic human tobacco consumption; (2) quantified the mainstream smoke of a single cigarette and/or single WTS session; and (3) reported smoke volume, nicotine, tar, and/or CO. In 2013 we conducted searches of OvidSP MEDLINE, Embase, Scopus, TOXLINE, Science Citation Index Expanded, BIOSIS Previews, and the Cochrane Library. Search strategies tailored to each individual database were developed by a professional research librarian. Reference lists of included studies were hand-searched to identify additional relevant articles. Two researchers independently reviewed all retrieved articles to identify studies meeting eligibility criteria. Two different researchers abstracted key quantitative information for meta-analysis, including measurement of smoke volume in liters, and nicotine, tar, and CO in milligrams. We developed structured spreadsheets to facilitate complete and accurate data collection. We then conducted meta-analyses to calculate summary estimates for the inhalation of each unique toxicant for each mode of tobacco consumption (waterpipe and cigarette). After performing meta-analyses, we used the established method of Fieller to calculate the ratio of each inhaled toxicant for a single waterpipe session compared with a single cigarette and the 95 % confidence interval of that ratio.

RESULTS: Regarding selection criteria, interrater reliability was high (98 % agreement, Cohen's $\kappa=0.83$). For the few initial disagreements, reviewers easily achieved consensus upon brief discussion. All specific numbers (toxicant amounts) included in meta-analyses

matched precisely between the two abstracting researchers (100 % agreement, Cohen's $\kappa=1.00$). Of 542 potentially relevant published articles, 272 represented unique studies. Of these, we eliminated 151 (56 %) that did not measure a single cigarette or WTS session, 88 (32 %) that were not laboratory experiments, and 16 (6 %) that did not assess one of the substances of interest. The 17 remaining studies were eligible for meta-analysis. The 9 WTS studies quantified inhalation of smoke volume ($n=4$), nicotine ($n=6$), tar ($n=5$), and CO ($n=5$). The 8 cigarette studies quantified inhalation of smoke ($n=5$), nicotine ($n=7$), tar ($n=7$), and CO ($n=5$). Based upon summary estimates obtained, one WTS session exposed users to 125.6 times the smoke volume of a single cigarette (95 % Confidence Interval [CI]=64.1, 190.7). Compared with a single cigarette, one WTS session also exposed users to 2.25 (95 % CI=1.39, 3.51) times the nicotine, 25.3 (95 % CI=9.5, 49.0) times the tar, and 10.9 (95 % CI=4.2, 17.9) times the CO. There were no significant differences between studies utilizing data from human subjects compared with studies utilizing machine smoking protocols.

CONCLUSIONS: This meta-analysis demonstrates consistently higher exposures in a WTS session compared to smoking a single cigarette, with large variation in the relative exposures by toxicant type. Compared with one cigarette, one WTS session exposed users to about 125 times the smoke volume, 25 times the tar, 2 times the nicotine, and 11 times the CO. These results suggest that there are potential health concerns posed by WTS and that it should be monitored. The estimates provided here may be valuable for clinical education and media-based interventions to reduce WTS. An important limitation of this work is the fact that we examined *inhaled* toxicant as opposed to *in vivo* toxicant. Because studies examining *in vivo* toxicants are currently highly varied in their methodologies, it was not feasible to combine them with meta-analysis at this time. Another important caveat is that a single WTS session generally requires one hour, while smoking a cigarette generally requires about 11 min. Despite these limitations, however, these findings suggest that waterpipe tobacco users are exposed to high toxicant loads of which they may be unaware.

TAKING INITIATIVE: INTEGRATING DATA FROM A LIFESTYLE MODIFICATION PROGRAM INTO AN ELECTRONIC HEALTH RECORD, A USABILITY STUDY Jordan Yoder; Rebecca G. Mishuris; Devin Mann. Boston University Medical Center, Boston, MA. (*Tracking ID #2199308*)

BACKGROUND: The Goal-focused Online Access to Lifestyle Support (GOALS) program is an online adaptation of the markedly successful Diabetes Prevention Program that aims to curb the burden of diabetes through education, coaching, and lifestyle modification. The program incorporates physical activity tracking, diet reporting, and educational modules with personalized lifestyle coaching. The program has been adopted broadly, and has been shown to help patients lose weight and improve blood pressure control. Despite their successes, there is limited meaningful interface between providers and behavior modification programs such as GOALS. There is a particular void in the ability of electronic health records (EHRs) to integrate lifestyle modification data. To date, little is known about the preferences of providers concerning the type, amount, and location of behavior change data or regarding its optimal workflow interface with the EHR. We designed a qualitative study to characterize the preferences of providers concerning the integration of lifestyle modification data from patients in the GOALS program into a primary care EHR workflow.

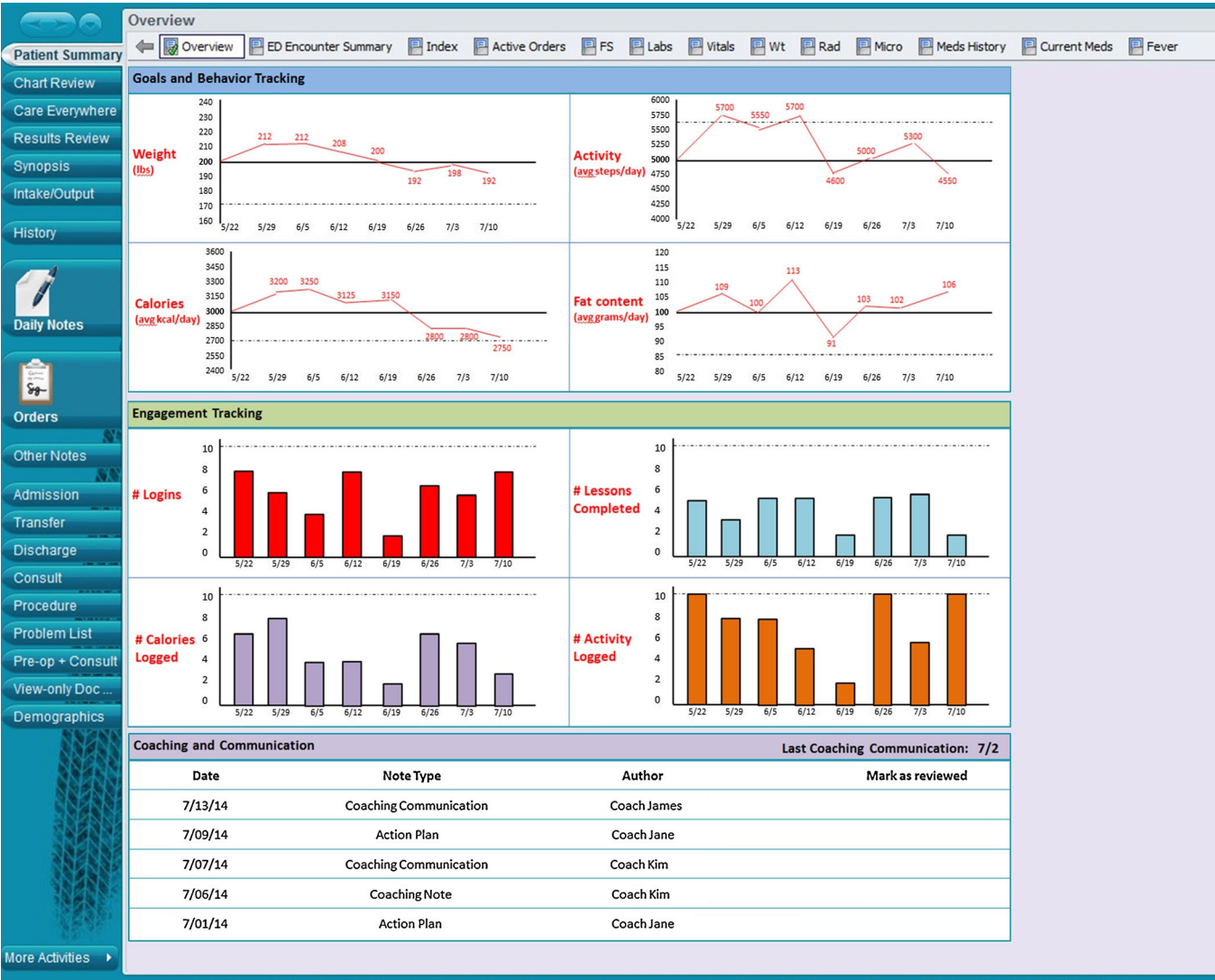
METHODS: Using a literature-based, semi-structured interview guide, we conducted in-depth interviews with primary care providers to inform the development of an EHR interface for the GOALS collaborative behavior change effort. Areas discussed included behavior change models, clinic workflow, and a draft of the potential EHR interface was displayed for providers to provide feedback. Interviews will be analyzed to identify workflow preferences which will then be used to develop a design document for prototype development.

RESULTS: To date, we have completed 9 of 10 planned provider interviews. All interviewees are faculty primary care providers in a large, academic medical center which uses a single electronic health record. Providers were recruited by email solicitation, with an effort to reach a cross-section of the providers in the General Internal Medicine and Family Medicine departments. All the providers to date are comfortable using the EHR with the patient in the room and counseling their patients on behavior change, however have limited ability to accomplish this during a clinic visit. The information most important to providers were patient engagement with the system and progress toward their goals. Providers preferred to receive reporting via the EHR only at the time of a clinic visit. When shown the EHR interface mockup, providers felt it met their needs in counseling patients in lifestyle modification programs, and provided suggestions for improvements such as the ability to overlay results graphs and print handouts to further reinforce goals with patients. They envisioned the data from the GOALS program being integrated into the clinician portion of the patient visit to review a patient's progress. The remainder of the interviews will be similarly analyzed to develop a consensus approach to

the design of the interface. We will employ an iterative design and rapid prototyping approach to develop the final interface design.

CONCLUSIONS: Lifestyle modification programs such as GOALS and the Diabetes Prevention Program have become an invaluable part of preventative medicine. Yet, they are limited by their relative inability to interface with the primary care providers. Similarly, with the rise of fitness trackers, mobile apps, and other digital health innovations, lifestyle modification data is becoming increasingly ubiquitous. However, there is no clear con-

sensus on how providers and EHRs could most effectively utilize these tools. We found that providers prefer high level data about patient engagement and progress toward goals which could be used to reinforce ideas presented by online coaches. With these findings, we intend to launch a pilot EHR interface in a large, academic primary care practice. If successful, such a program could provide a pathway to broad integration of behavior change information into primary care clinics' workflow, thereby more effectively promoting health and wellness and preventive care.



Mockup of EHR Interface to display lifestyle modification data from GOALS Program

TARGETED NEWSLETTERS TO PROMOTE CANCER CONTROL IN AFRICAN AMERICANS Monica Ferguson; Marilyn M. Schapira; E. P. Wileyto. University of Pennsylvania, Philadelphia, PA. (Tracking ID #2200659)

BACKGROUND: African Americans experience excess morbidity and mortality from breast and colon cancers. Decreased intake of fruits and vegetables and reduced rates of exercise have been associated with higher rates of these two cancers. In addition to having lower rates of cancer screening, African Americans are less likely than whites to adhere to national guidelines for fruit and vegetable intake and physical activity. Print materials have been used successfully to increase cancer screening, fruit and vegetable intake, and physical activity. Interventions using materials targeted towards African Americans to change these behaviors have had mixed results, perhaps because few of these interventions

have been developed using a theoretical framework that encompasses specific community social and ecological constructs. The purpose of this study was to evaluate a series of newsletters developed using the social ecological model of behavior change and designed to motivate African American patients to adopt healthy behaviors to decrease cancer risk.

METHODS: Content areas for the newsletters were informed by theoretically based communication strategies to promote cancer control. The development phase included evaluation of a broad range of potential newsletter content and formats in focus groups consisting of our target population (African-American patients from one urban medical practice, age 40–70, residents of 5 zip codes). Finalized newsletters were mailed to 500 patients once a month for 6 months. A prospective cohort study design was used to compare our intervention group ($n=500$) to a control group ($n=51$) from our target population who were not mailed the newsletters. Outcomes were evaluated by telephone survey and included reach, uptake, daily fruit and vegetable intake, and weekly exercise. We also developed and administered a 12-item knowledge survey and assessed behavioral intentions related to cancer screening and healthy behaviors. Chi square was used to

compare outcomes of interest. Continuous and count outcomes were tested using generalized linear models, with Gaussian family models for continuous outcomes and binomial or negative binomial family models for count outcomes. Hypotheses were then tested in regression models.

RESULTS: Out of 500 patients, one newsletter was undeliverable and one patient opted not receive the newsletters. We successfully contacted 310 of the remaining 498 patients who were mailed the newsletters (62 %). Of these, 60 % recalled receiving the newsletters, 53 % read the newsletters, and 24 % shared one or more newsletters with family or friends. The intervention group reported a higher intake of fruit per day than controls (1.77 servings vs 1.29), a finding that remained statistically significant after controlling for a higher proportion of women in the intervention group in negative binomial regression analysis ($p=0.03$, Table 1). However, no difference was found in vegetable intake, exercise, behavioral intentions regarding diet, exercise, and cancer screening or in knowledge scores.

CONCLUSIONS: We demonstrate high uptake of targeted newsletters that were designed using the social ecological model of behavioral change to address cancer disparities among an African American primary care population. Further, the intervention was associated with a higher reported intake of fruit, a lifestyle change that increases cancer control. Mailing a series of targeted newsletters is a feasible strategy to communicate important health information which may result in behavior change.

Impact of Targeted Newsletters on Reported Health Behaviors

	Mean (SD)		IRR or	95 %	p-value
	Intervention	Control	OR	CI	
Daily Servings of Fruit	1.77 (1.52)	1.29 (1.00)	1.35	1.03, 1.77	0.03
Daily Servings of Vegetables	1.83 (1.54)	1.73 (1.25)	1.06	0.84, 1.34	0.62
Weekly Exercise (Days per week)	3.23 (2.42)	3.01 (2.65)	1.13	0.90, 1.41	0.28

TEACHING WOMEN'S HEALTH TO ATTENDING PRIMARY CARE PROVIDERS—CURRICULUM IMPROVES CONFIDENCE OF FACULTY AND THEIR TRAINEES Ann R. Garmen⁴; Valerie Perel²; Lynn Bui³; Anne Dembitzer^{1,3}. ¹NY Harbor VA, New York, NY; ²NYU Department of Internal Medicine, New York, NY; ³New York University, New York, NY; ⁴New York University School of Medicine, New York, NY. (Tracking ID #2198062)

BACKGROUND: Access to and quality of routine women's healthcare is greatly increased when clinical educators are able and confident to deliver such care. However, many primary care providers feel uncomfortable both offering basic women's healthcare to their patients and teaching residents this material. Toward the end of improving patient care, we designed a curriculum to strengthen attendings' ability to offer women's healthcare to their own patients. We also measured the impact of this on their confidence teaching such topics to internal medicine residents as well as the impact on trainee comfort with managing women's health-related issues.

METHODS: We developed a women's health curriculum consisting of a series of 3 1-hour workshops (the breast exam and management of common breast complaints; the pelvic exam and management of vaginitis; and preconception counseling), simulations sessions (practice of breast and pelvic exams on models), and online resources. The curriculum was offered to all faculty who both practice and teach at our hospital's Adult Primary Care Clinic. Following each workshop participants were asked to provide Commitment to Change (CTC) statements through which they set personal behavior change goals regarding their practice and teaching. Participants also completed retrospective assessments to evaluate changes in their practice and teaching confidence and were surveyed several months later regarding their ability to incorporate the behavior changes they had previously listed on their CTCs. Residents were asked about their satisfaction with attendings' teaching of women's health-related topics and their own ability to manage women's health issues before and after the attendings received the curriculum.

RESULTS: Twenty-five attendings enrolled in our study (76 % female), and 100 % of the participants completed the retrospective survey. Following completion of the workshops, faculty reported improvements in both their ability to manage and their confidence teaching about all domains covered in the curriculum. For example, on a scale of 1 (not confident at all) to 4 (very confident), participants improved from 2.72 to 3.24 regarding their ability to perform a breast exam ($p=0.0002$, $d=0.654$) and from 2.56 to 3.2 regarding their ability to supervise residents performing a breast exam ($p=0.001$, $d=0.777$);

participants improved from 2.44 to 3.12 regarding their ability to perform a pelvic exam ($p=0.001$, $d=0.834$) and from 2.32 to 3 regarding their ability to supervise residents performing a pelvic exam ($p=0.0009$, $d=0.802$); and participants improved from 2.4 to 2.76 regarding both their own ability to begin preconception counseling as well as supervise residents about preconception counseling with female patients ($p=0.006$, $d=0.591$ and $p=0.001$, $d=0.591$ respectively). Sixty-seven percent of respondents reported that they had either fully or partially incorporated their CTC goals into their clinical practice and 67 % into their teaching practice. Ninety-eight percent of the residents ($n=128$) completed pre- and post-curriculum surveys; 33 % were PGY1, 34 % PGY2, and 34 % PGY3; 46 % were female. Residents reported a statistically significant improvement in management of their patients' pelvic complaints ($p=0.05$); there were trends toward improvement in satisfaction with attendings' ability to precept cases regarding breast complaints, pelvic complaints and contraception; and there were trends toward improvement in management of patients' breast complaints and contraception. Residents' confidence in managing their patients' breast health correlated with their satisfaction with attendings' ability to precept such cases ($r^2=0.442$, $p=0.003$).

CONCLUSIONS: Our women's health curriculum for attending physicians - which incorporated workshops, simulation-based skills practice, online resources and goal-setting—improved their confidence in both their own patient-care practice and teaching trainees. In addition, resident satisfaction with attending supervision as well as resident confidence providing women's healthcare trended toward improvement in multiple domains. This type of attending-focused intervention has the potential to improve access to high-quality care for women.

TECHNOLOGY ACCESS AND COMPUTER SKILLS IN ONLINE SELF-MANAGEMENT SUPPORT Reem M. Hanna²; Gary Fischer¹; Molly B. Conroy¹; Laurey R. Simkin-Silverman¹; Rachel Hess¹; Kathleen M. McTigue². ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2199696)

BACKGROUND: The USPSTF recommends screening all adults for obesity and offering or referring obese patients to a behavioral intervention. Primary care providers are aware of the importance of addressing obesity, but there are numerous barriers to providing intensive counseling during clinic appointments. Health information technology and online tools are promising avenues for providing convenient self-management support. For such approaches to be effective, patients must have access to a computer and the internet, and possess basic computer skills. Little is known about computer use patterns among primary care patients who could benefit from online lifestyle support, or how patterns of technology access influence outcomes of an online weight loss intervention.

METHODS: We conducted a randomized controlled clinical trial to test an online behavioral lifestyle treatment in six primary care practices. Patients who felt that they could access the Internet at least weekly were enrolled in a year-long online weight loss program with a lifestyle coach or automated coaching, or an education control via a referral from their PCPs. Participants were surveyed at baseline regarding their computer use patterns, internet access, and computer skills. We used descriptive statistics including means and standard deviations to examine baseline computer access and skill level among all participants. In the subset in one of the two arms that received the comprehensive intervention, student T-tests determined whether patients' computer skills and internet access were associated with their measured 12-month weight loss.

RESULTS: Three hundred seventy-three obese adults were enrolled and 255 received one of the two comprehensive lifestyle interventions. On average, participants were age 49.4 (SD 12.6), and weighed 106.1 kg (SD 20.7). Of the sample, 76 % were female and 20 % were African American. Among all study participants, 7 % self-reported beginner-level computer skills, 39 % intermediate, 41 % advanced, and 13 % expert. Of the 373 patients, 351 (96 %) reported having a computer at home, 69 % used a computer at work, and 22 % used public computers. Forty-one percent of participants reported that the main purpose of using their home computer was online activities while 42 % reported that it was primarily used for work. Many participants reported using the internet to obtain health information (38 %) or to obtain nutritional information (38 %). Only 0.3 % of participants reported that they did not use the internet prior to enrollment. Patients with lower levels of computer skills (beginner/intermediate) showed similar mean weight loss to those with higher levels (advanced/expert); (-3.1 vs. -3.7 kg; $p>0.05$). No significant difference was noted in the magnitude of weight loss between patients who used a computer daily and those that did not ($p>0.05$). There was no significant difference in weight change between patients who reported the presence of home computer and those who did not ($p>0.05$). Similarly, there was no difference between patients who used computer at work and those who did not. However, patients

who reported using public computers experienced significantly less weight loss at the end of the one year intervention compared to those who did not use a public computer (-1.4 ± 6.8 kg vs. -4.0 ± 7.0 kg; $p=0.047$).

CONCLUSIONS: Primary care patients recruited for an online lifestyle intervention had a broad range of self-reported computer skills. Most had computer access at home or at work, and nearly a quarter accessed public computers. While perceived computer skills or access to a computer at home or at work were not associated with 12-month weight loss, patients who accessed public computers had significantly less weight loss at the completion of the 1-year intervention. Interventions aiming to bolster self-management support via the internet should accommodate a range of patient computer skills. Public computer access may be less effective for delivering an online intervention than access at home or work locales.

TEST CHARACTERISTICS OF PROPOSED STRATEGIES TO SELECT ASYMPTOMATIC OLDER MEN FOR INITIAL BONE MINERAL DENSITY TESTING: RESULTS FROM THE OSTEOPOROTIC FRACTURES IN MEN (MROS) STUDY Susan Diem¹; Katherine Peters²; Margaret L. Gourlay³; John Schousboe^{1, 4}; Brent C. Taylor^{1, 5}; Eric Orwoll⁶; Jane Cauley⁷; Carolyn J. Crandall⁸; Kristine E. Ensrud¹. ¹University of Minnesota, Minneapolis, MN; ²University of California, San Francisco, CA; ³University of Carolina, Chapel Hill, NC; ⁴Park Nicollet Health Services, Minneapolis, MN; ⁵VA Healthcare System, Minneapolis, MN; ⁶Oregon Health Sciences University, Portland, OR; ⁷University of Pittsburgh, Pittsburgh, PA; ⁸University of California, Los Angeles, CA. (Tracking ID #2180509)

BACKGROUND: The best strategy to select older asymptomatic men for osteoporosis screening is uncertain. We evaluated the operating characteristics of currently proposed strategies for selecting men for initial BMD testing for the detection of osteoporosis.

METHODS: We measured bone mineral density (BMD) using DXA at the femoral neck, total hip, and lumbar spine in 4057 community dwelling men age ≥ 70 years without bisphosphonate use or a history of previous clinical vertebral or hip fracture. Information regarding demographic characteristics, anthropomorphic measures, and medical history, including history of previous fractures, was collected. Ten year risk of a major osteoporotic fracture (clinical spine, hip, forearm, or shoulder fracture) was calculated using the FRAX model without BMD. Our primary outcome was osteoporosis as defined by a femoral neck T-score of ≤ -2.5 or below calculated using a young female normal referent base. Our secondary outcome was osteoporosis as defined by a T-score of ≤ -2.5 or below at the femoral neck, total hip or lumbar spine. We calculated the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for the identification of men with osteoporosis using the following screening strategies: 1) Screen all men aged 70 years and older; 2) screen men with a 10-year predicted major osteoporotic fracture at or above that of an average 65 year old Caucasian woman (i.e. ≥ 9.3 %); 3) screen men at varying cutoff points (ranging from -1 to 2) of the Osteoporosis Self-Assessment Tool (OST) score [(WEIGHT (KG)—AGE (YR)) X 0.2].

RESULTS: The mean age of men in the cohort was 76.3 (± 4.8 years). One hundred five (2.6 %) had a femoral neck T score of ≤ -2.5 and 220 (5.4 %) had a femoral neck, total hip, or lumbar spine T score of ≤ -2.5 . The proportion of men referred for testing ranged from 23.5 % for an OST cutoff of ≤ -1 to 100 % for the strategy of screening all men 70 years and older. Test characteristics of the screening strategies for the detection of men with a femoral neck T-score ≤ -2.5 appear in Table 1. Use of an OST cutoff of 1-2 had a sensitivity of 85-90 % for identifying men with a femoral neck T-score ≤ -2.5 , with a specificity ranging from 0.36-0.51. Use of a FRAX estimated risk of a major osteoporotic fracture of 9.3 % had a sensitivity of 0.77 and specificity of 0.58. All strategies had a low PPV due to the low prevalence of osteoporosis among men. For the secondary outcome of femoral neck, total hip, or lumbar spine T score ≤ -2.5 , the strategy of screening men with a FRAX estimated 10-year risk of a major osteoporotic fracture of ≥ 9.3 % had a sensitivity of 0.60 and specificity of 0.59; an OST score of ≤ 2 had a sensitivity of 0.83 and specificity of 0.36.

CONCLUSIONS: The prevalence of osteoporosis in this cohort of asymptomatic community dwelling men was similar to that reported for a population based sample of older men enrolled in NHANES 2005-2010. We found that recommended strategies for selecting older men for initial BMD testing varied widely in the proportion of men who were chosen for testing. Use of the OST with a cutoff of ≤ 1 or 2 identified 85-90 % of men with femoral neck osteoporosis, while substantially reducing the number of men referred for testing compared with the strategy of testing all men 70 years and older. In contrast, use of the more complex FRAX based strategy identified 71 % of men with femoral neck osteoporosis. These findings suggest that a simple strategy based on age and weight performs better than a more complex FRAX based strategy in selecting older asymptomatic men for BMD testing to detect osteoporosis.

Operating characteristics of proposed screening strategies for the detection of men with femoral neck T-score ≤ -2.5

Screening strategies	% of men referred for BMD testing	Sensitivity	Specificity	PPV	NPV
Age ≥ 70 years	100 %	1.00	0.00	0.03	0.00
FRAX ≥ 9.3 %	42.4 %	0.71 (0.62, 0.8)	0.58 (0.57, 0.60)	0.04 (0.03, 0.05)	0.99 (0.98, 0.99)
OST ≤ -1	23.5 %	0.52 (0.42, 0.62)	0.77 (0.76, 0.79)	0.06 (0.04, 0.07)	0.98 (0.98, 0.99)
OST ≤ 0	36.6 %	0.71 (0.62, 0.80)	0.64 (0.63, 0.66)	0.05 (0.04, 0.06)	0.99 (0.98, 0.99)
OST ≤ 1	50.3 %	0.85 (0.76, 0.91)	0.51 (0.49, 0.52)	0.04 (0.04, 0.05)	0.99 (0.99, 1.0)
OST ≤ 2	64.6 %	0.90 (0.82, 0.95)	0.36 (0.35, 0.38)	0.04 (0.03, 0.04)	0.99 (0.99, 1.0)

TEXT MESSAGING VERSUS USUAL CARE FOR WEIGHT LOSS IN PATIENTS WITH PRE-DIABETES Ilana P. Fischer¹; Henry H. Fischer¹; Rocio I. Pereira^{1, 2}; Jeanne M. Rozwadowski^{1, 3}; Silvia Gutierrez-Raghuath¹; Anna L. Furniss³; Michael J. Durfee¹; Susan L. Moore¹; Adam G. Tsai^{4, 3}; Karen Albright^{2, 3}; Edward P. Havranek^{1, 3}. ¹Denver Health and Hospital Authority, Denver, CO; ²University of Colorado, Anschutz Medical Campus, Aurora, CO; ³University of Colorado School of Medicine, Aurora, CO; ⁴Kaiser Permanente, Denver, CO. (Tracking ID #2191733)

BACKGROUND: Approximately one-third of Americans are considered to have pre-diabetes, with low-income and Latino patients representing a disproportionate share of those that go on to develop diabetes. Moderate weight loss has been shown to be effective in preventing diabetes, with long-lasting benefits that persist even with partial weight regain. Intensive behavioral interventions like the Diabetes Prevention Program (DPP) are effective for weight loss, but may be inaccessible for patients of low socioeconomic status and are expensive for safety-net providers to administer. This study tests the effectiveness of a 1-year text message-based program for weight loss compared to usual care.

METHODS: This randomized control trial was conducted at the Westside Clinic, one of Denver Health's federally qualified health centers, providing nearly 20,000 unique visits annually to a predominantly Latino patient population (80 %). Subjects were recruited from an eligible pool of 1116 English or Spanish-speaking patients without diabetes, ages 18 and older, with HbA1c greater than 5.6 % but less than 6.5 % and BMI between 25 kg/m² and 50 kg/m². Enrolled patients were randomized to the text-message based intervention or to usual care. Text message content was developed using the National DPP curriculum and refined with input from patient focus groups. Starting April 2014, intervention patients received six messages per week (in English or Spanish) relating to nutrition, physical activity, and motivation, as well as a once-weekly text message querying for most recent weight. Intervention patients were also eligible for individual motivational interviewing appointments with a health coach, generally by telephone. Control patients did not receive weekly messages or motivational interviewing, but like intervention patients were eligible for all standard-of-care weight loss resources at Denver Health including access to DPP classes and individual appointments with a nutritionist or nurse for diet support. The primary outcome was weight lost, by amount in pounds and by percent. Patients returned for an interim 6-month weigh-in. These data are presented below.

RESULTS: Of the 163 individuals enrolled, 3 were lost to follow-up due to pregnancy, leaving 160 individuals in this analysis. At 6 months, mean weight loss was 3.6 lb in the intervention group versus 1.7 lb in the control group ($p=0.12$). Thirty-one intervention patients versus 18 control patients ($p=.03$) achieved at least 3 % weight loss while 19 intervention versus 10 control patients achieved at least 5 % weight loss ($p=0.08$). A larger proportion of Spanish-speakers were randomly assigned to the intervention group; the intervention effect was observed among Spanish-speakers but not among English-speakers (see table).

CONCLUSIONS: The 6-month results of this study demonstrate that a text-message based intervention may be effective in helping low-income, Spanish-speaking individuals achieve modest weight loss. Effectiveness of the intervention among English-speakers is

unclear as uneven randomization by language may have affected our results. This will be examined further upon completion of the study in April 2015. Nevertheless, the interim

data show promise for a low-cost, wide-reaching text message approach to achieve moderate weight loss in patients with pre-diabetes.

Baseline to 6 Month Follow-up Weight Loss, by Intervention and Control groups and by Language

Measure	All (n = 160)			Protocol in English (n = 71)			Protocol in Spanish (n = 89)		
	Intervention	Control	p-value*	Intervention	Control	p-value*	Intervention	Control	p-value*
Total	81	79	--	28	43	--	53	36	--
Baseline mean weight in lbs, (SD)	195.3 (42.4)	201.2 (39.9)	--	222.8 (51.3)	212.4 (39.7)	--	180.8 (27.8)	187.9 (36.3)	--
6 months mean weight in lbs, (SD)	191.7 (45.7)	199.5 (40.3)	0.12	223.4 (57.7)	210.9 (41.3)	0.66	174.9 (25.6)	186.0 (35.1)	0.28
Patients with $\geq 3\%$ weight loss, (%)	31 (38.3)	18 (22.8)	0.03	7 (25.0)	12 (27.9)	0.79	24 (45.3)	6 (16.7)	0.005
Patients with $\geq 5\%$ weight loss, (%)	19 (23.5)	10 (12.7)	0.08	3 (10.7)	5 (11.6)	1.00 [†]	16 (30.2)	5 (13.9)	0.08

*Wilcoxon sign-ranked test used for continuous variables; Chi-square test of proportions used for categorical variables; significant at $p < .05$

[†]Fischer's exact test used due to small cell frequencies

THE ASSOCIATION BETWEEN DIFFERENT FORMS AND FUNCTIONS OF MENTORING AND CAREER OUTCOMES AMONG FEMALE FACULTY IN ACADEMIC MEDICINE Lyndonna M. Marrast¹; Rene caraphina²; Michael Wake²; Emorcia Hill²; Joan Reede². ¹Hofstra North Shore LIJ School of Medicine, Kew Gardens, NY; ²Harvard Medical School, Boston, MA. (Tracking ID #2198947)

BACKGROUND: Mentorship is recognized as valuable to success in academic medicine. Mentoring can take various forms (i.e. formal versus informal, single versus multiple mentors) and serve different functions (i.e. psychosocial and/or career-oriented support). Prior studies have been limited by sample size, involvement of one specialty and/or setting at a single institution. In this study, we add to the growing body of literature reporting on the impact that different forms and functions of mentoring have on career outcomes related to grants, publications and promotion of a diverse group of female faculty across multiple institutions and sub-specialties.

METHODS: Using online survey data from the Women in Academic Medicine (WIAM) study, we conducted a comparative investigation of the association between different forms and functions of mentoring and career outcomes, including: receipt and/or funding of a NIH K-award, NIH RO1-award, external grant, being aware of or having seen promotion criteria at one's institution, planning to seek promotion, and number of peer reviewed manuscripts published. We used Chi Square to assess differences between forms of mentoring. We then calculated adjusted odds ratios using multivariable logistic regression controlling for age, race/ethnicity, rank, time at the institution, department type, having an additional degree, fellowship training, and early exposure to academic medicine to assess the impact of mentoring type and function on these specific career outcomes.

RESULTS: Among the sample of 3, 127 women, the majority, 62 %, reported that they have received some form of mentoring at some time in their careers. Over one-third reported they *currently* have a mentor, 11.4 % reported having a single mentor and 25.9 % have several mentors. Participants with multiple mentors and those receiving formal mentorship during fellowship and as junior faculty were more likely to have applied for grants (K-award, external, and RO1, P-value<0.05). Having multiple mentors impacted one having seen the institution's promotion criteria but did not impact their intent to seek promotion. In multivariable analysis, those with multiple mentors had higher odds of receiving funding for a K-award (OR 3.64; CI 1.89–7.00) or an external grant (OR 1.63; CI 1.05–2.56). We did not find a strong association between receiving career support from mentors and outcomes in multivariable models. However, a disaggregation of mentor functions reveals a positive association between some functions with publications and promotion preparation but no relationship to grant-related outcomes.

CONCLUSIONS: Having multiple mentors and formal mentors is important for the promotion and publication processes within academic medicine. The art of successful grant writing may require mentoring functions that are not captured in the current scale. Future research is needed to identify the characteristics of mentoring that lead to positive results regarding applying and obtaining grants. Women in academic medicine have varying definitions of career success; therefore mentorship must be congruent to the needs of the women based on career goals.

THE ASSOCIATION BETWEEN INSURANCE TYPE AND COST-RELATED DELAY IN CARE: A SURVEY OF ACCESS TO CARE IN MASSACHUSETTS

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BACKGROUND: Massachusetts has had a health insurance mandate since 2006, resulting in insurance rates similar to those projected under the Affordable Care Act (ACA). As a result, many patients in Massachusetts have private insurance plans with low premiums but high out-of-pocket costs. In this survey study, we aimed to explore the relationship between insurance type (private or public) and self-reported access to health care as well as self-reported delays in care due to cost.

METHODS: Using previously validated instruments as a guide, we designed, pilot-tested and administered a questionnaire to English-speaking adult patients and their companions who presented to the waiting rooms of one adult emergency department and two outpatient clinics. The questionnaire was designed to enable us to examine the relationship between insurance type (Public: Medicaid, Medicare, Commonwealth Care; Private; or Uninsured) and validated measures of access to health care (e.g., cost-related delay in care, emergency department as usual source of care, having a PCP). Results were stratified by tertiles of per-person household income (PPHI). We generated descriptive statistics and tested an interaction term between income, insurance, and delay in care using the Likelihood Ratio (LR) test. We then created a multiple logistic regression model that included an insurance-by-income level interaction term with age, sex, and race/ethnicity as covariates.

RESULTS: Of 800 people approached, 619 (77 %) completed the survey. Respondents were 60.6 % female and 40.2 % white, 37.2 % Hispanic, 12.6 % Black and 9.1 % other. Out of those surveyed; 47.3 % were employed (including self-employed), 22.0 % were disabled and 12.0 % were unemployed. Most had public insurance (61.4 %); 34.1 % had private insurance and 4.5 % were uninsured. Overall, 30.5 % (95 % CI 27.0 %, 34.3 %) reported delay in health care for any reason. Cost was the most commonly cited reason for delay (22.0 %, 95 % CI 10.8 %, 16.2 %). Tertiles of the PPHI corresponded roughly with cutpoints from the 2014 Federal Poverty Guidelines: (tertile 1: <\$12,500; tertile 2: \$12,500 to <\$25,000; tertile 3: \geq \$25,000) Privately insured subjects were significantly more likely than publicly insured to delay care due to cost in the middle-income group (private insurance 18.5 %, public insurance 7.2 %, OR 3.18, 95 % CI 1.27, 7.98), but not in the lower income (4.6 % vs. 11.8 %, OR 0.34, 95 % CI 0.07, 1.64) or upper income (12.0 % vs. 12.2 %, OR 0.97, 95 % CI 0.31, 3.11) groups. Out-of-pocket costs significantly mediated the association between delay in care and insurance type in the middle income stratum (16 % reduction to private vs. public regression coefficient, $p=0.02$).

CONCLUSIONS: A substantial number of patients in a state with an insurance mandate report cost-related delays in care. Patients with private insurance and PPHIs above \$12,500 and under \$25,000 were more likely to report cost-related delays in care compared to similar respondents with public insurance; this difference appears to be mediated by out-of-pocket costs. These findings suggest that, compared to publicly-insured patients, some privately-insured patients may be more likely to experience cost-related delays in care after full implementation of the ACA.

THE ASSOCIATION OF NEIGHBORHOOD ENVIRONMENT AND MORTALITY: RESULTS FROM A NATIONAL STUDY OF VETERANS

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BACKGROUND: The VHA is the largest integrated US health system and is increasing its focus on community strategies to improve health outcomes. Neighborhood environment is thought to influence health on a variety of levels and neighborhood factors may capture information not available at the individual level. However, there is limited evidence about the association of neighborhood environment and health outcomes among Veterans. We sought to determine the association of neighborhood factors with all-cause mortality rates among Veterans.

METHODS: We used data from the VA Corporate Data Warehouse (CDW) to obtain individual data on vital status, clinical and demographic characteristics. The Gagne comorbidity index was generated to estimate individual risk based on diagnoses occurring in 2011. Census Tract level socio-economic data was obtained from the US Census Bureau and linked to individuals by residence. Census tract level socio-economic status (SES) was characterized by a previously validated index based on 6 components: 1) percentage of adults >25 y old with less than a high school education; 2) percentage of unemployed males; 3) percentage of households with income below the poverty line; 4) percentage of households receiving public assistance; 5) percentage of households with children that are headed by a female; and 6) median household income. The SES index was calculated as the sum of component z-scores standardized to range from 0 to 1 with increasing SES. Logistic regression was used to model the association of the tract level SES index with all-cause mortality in 2012 while controlling for individual level co-morbidity and other demographic characteristics.

RESULTS: We analyzed data on all Veterans alive on January 1, 2011 for which vital status, demographic and SES data were available ($n=4,814,631$). The majority of Veterans were men (94 %), either white (75 %) or black (15 %), and resided in urban areas (62 %). Tract level SES had a large effect on the likelihood of mortality after controlling for individual co-morbidity and demographics. After categorizing the SES index into deciles, individuals living in tracts with an SES Index in the 1st decile (lowest SES) were 30 % (OR 1.3, 95 % Confidence Interval: 1.26, 1.34) more likely to die in 2012 than individuals living in tracts in the 10th decile (highest SES). The likelihood of mortality decreased with increasing decile of SES status. For example, mortality for individuals living in the 9th decile was 4 % more likely (95 % CI: 1.012, 1.066) compared to the highest decile.

CONCLUSIONS: Neighborhood socioeconomic environment is strongly associated with all-cause mortality among Veterans independent of individual-level comorbidities and socioeconomic characteristics. Strategies to improve health ultimately will need to incorporate information about neighborhood characteristics.

THE BUILT AND SOCIAL ENVIRONMENT: NEIGHBORHOOD OBESITY IN VULNERABLE POPULATIONS

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BACKGROUND: People living in low-income, minority neighborhoods have disproportionately high rates of obesity and obesity-related disease (e.g. diabetes). Observational studies suggest, with mixed findings, that poor access to healthy food or recreational space, racial segregation, and psychosocial stress are all potential environmental mechanisms for behaviors that contribute to these conditions (e.g. poor diet, sedentary lifestyle). However, many of these larger studies rely on secondary data for measures of the built environment and health. This study draws on contemporaneous primary data collected on Chicago's South Side to gain a more robust understanding of the relationship between the neighborhood built and social environment with obesity in vulnerable populations.

METHODS: This study included an address-based probability sample of 267 residents, aged 35 and older, enrolled from Chicago's South Side from November 2012-July 2013. During hour-long, in-person interviews, participants were queried about the neighborhood built environment (awareness and use of grocers and primary care), social environment (validated measures of neighborhood satisfaction, safety, social cohesion, and social control), demographics, and health status. Biological measures (height, weight, and HbA1c) were obtained at the time of interview. Data from the 2012 MAPSCorps asset census, a comprehensive census of all operating, public-facing businesses and organizations, were paired with survey data to calculate distances to neighborhood resources that participants reported using (utilized resources, d_u) and distances to resources closest to home (nearest resources, d_n). Multiple linear regression was used to evaluate associations between the neighborhood built and social environment with body mass index (BMI). All analyses were adjusted for age, gender, income, and self-reported health status. Survey

weights were used to adjust for differential probability of selection and non-response in order to generate population estimates.

RESULTS: The overall cooperation rate was 62 %. People were primarily African American (53.6 %) and non-Black Hispanic (34.8 %), female (57.8 %), and between the ages of 35–70 (mean age 55.0 ± 1.0 years). Approximately half (52.8 %) were obese ($BMI \geq 30$). Overall, participants did not utilize the resources nearest to their homes. More than three quarters (80.7 %) utilized a grocer that was further than their nearest grocer ($d_n = 2.3$, $d_u = 1.1$; $P < 0.01$). BMI was not associated with distance to nearest grocer, but each additional mile traveled to utilized grocer was associated with a 0.8 kg/m^2 increase in BMI (95 % CI, 0.4–1.3; $P < 0.01$). Few participants reported having a regular primary care physician (PCP) (total 21.6 %; obese 19.9 %). However, the majority did have access to a PCP when necessary (total 93.3 %; obese 94.7 %). BMI was not associated with distance to nearest PCP, but each additional mile traveled to utilized PCP was associated with a 0.2 kg/m^2 increase in BMI (95 % CI, 0.1–0.4; $P < 0.01$). Neighborhood social environment, with the exception of neighborhood theft, was not significantly associated with obesity. Any prior experience of theft was associated with a 3.0 kg/m^2 increase in BMI (95 % CI, 1.0–5.0; $P < 0.01$).

CONCLUSIONS: Our findings suggest that distance to utilized grocer, distance to utilized PCP, and neighborhood theft may be several factors in the built and social environment that drive previously identified associations between neighborhoods and health. Notably, there is a discrepancy between the resources nearest to home and the resources actually utilized. These findings suggest that it is not sufficient for community resources to be ‘merely available’ nearby. Low-income communities may have lower quality resources, not just fewer resources, and this may be a more powerful predictor of health than quantity. Moreover, neighborhood theft is most strongly associated with obesity, further emphasizing the impact of social influences on health and presumptively, health-seeking behavior. Thus, it is necessary to examine the many factors mitigating patient preference (e.g. affordability, accessibility, safety, quality) in building a resource infrastructure with downstream health effects. In summary, developing holistic strategies that address neighborhood crime and local access to high-quality community resources may be critical to curbing the obesity epidemic in vulnerable populations.

THE COLORADO TRANSGENDER HEALTH SURVEY

Robin Christian; Rita Lee. University of Colorado, Aurora, CO. (Tracking ID #2196394)

BACKGROUND: Transgender people, those whose gender identity does not match their birth sex, face discrimination in many areas of life. Previous work has identified barriers to receiving appropriate health care, including discrimination, prohibitive cost, and difficulty finding a provider. The Colorado Transgender Health Survey sought to explore current disparities and their effects on the health of transgender people in Colorado.

METHODS: The Colorado Transgender Health Survey was developed through collaboration between the Colorado LGBT Health Coalition, the Colorado Department of Public Health and Environment, and transgender community members. The survey was based on the Behavioral Risk Factor Surveillance System (BRFSS). The survey was primarily web-based, using convenience and snowball sampling techniques. Outreach was performed at transgender-specific events, LGBT pride festivals, colleges and universities, LGBT support organizations, healthcare providers, churches, and their networks/social media. Participation was voluntary and anonymous. Results from participants who identified as transgender or gender-nonconforming, lived in Colorado, and were over the age of 18 were included in the analysis. Descriptive statistics were used.

RESULTS: There were a total of 507 respondents, 417 of whom met inclusion criteria. Forty-eight percent of our sample were assigned female at birth—43 % currently identify as a woman/transgender woman and 29 % identify as a man/transgender man. In all, 25 distinct gender identities were reported. Forty-two percent of had a household income under \$25,000, though 61 % hold a college degree. The most recent BRFSS reported that 24 % of Colorado households earn under \$25,000, and 33 % of Coloradans hold a college degree. Eighty-six percent of our sample has health insurance—59 % receive insurance through work or school, 13 % have individual insurance, and 19 % have Medicaid. Forty percent reported delaying necessary medical care due to cost (40 %), inadequate insurance coverage (23 %), as well as fear of discrimination (31 %). While the overall health of our sample appeared similar to the general population of Colorado, mental health outcomes were drastically different—53 % had been diagnosed with an anxiety disorder, 44 % were currently depressed, 36 % had contemplated suicide in the past year, and 10 % reported attempting suicide in the past year. Respondents with an inclusive provider were more likely to receive wellness exams (76 % vs 48 %), less likely to delay care due to discrimination (24 % vs 42 %), were more likely to report excellent, very good, or good health (84 % vs 75 %), and were less likely to be depressed (38 % vs 54 %) or attempt suicide (7 % vs 15 %).

CONCLUSIONS: This survey found that the transgender community in Colorado continues to face significant disparities. Mental health is highlighted as a critical element in addressing health disparities in this community. The impact of a transgender-friendly provider was found to be a major factor in improving health and health behavior. Limitations include convenience and snowball sampling design, Colorado only sample, and lack of inclusion of adolescents and youth that limit generalizability. Further research and education on transgender health and health care should be incorporated into national efforts to eliminate health disparities.

THE COURSE OF FUNCTIONAL IMPAIRMENT IN OLDER HOMELESS

ADULTS Theora Cimino¹; Michael A. Steinman²; Yinghui Miao²; Susan Mitchell³; Monica Bharel⁴; Rebecca Brown². ¹School of Medicine, University of California, San Francisco, San Francisco, CA; ²Division of Geriatrics, University of California, San Francisco, San Francisco, CA; ³Hebrew SeniorLife Institute for Aging Research, Boston, MA; ⁴Boston Health Care for the Homeless Program, Boston, MA. (Tracking ID #2196383)

BACKGROUND: Functional impairment is common in homeless adults in their fifties and sixties. Because these individuals are relatively young, it may be reasonable to assume that many of these impairments are transient. However, it is unknown if functional impairment among older homeless adults is transient or persistent, and thus whether long-term interventions are needed to address these deficits.

METHODS: We recruited 250 homeless adults age 50 and older from 8 homeless shelters in Boston, MA. At baseline and 12 months, participants reported if they had difficulty performing 5 Katz activities of daily living (ADLs) and 6 instrumental activities of daily living (IADLs). We assessed IADLs using a validated instrument developed for use in homeless persons. We defined persistent ADL impairment as difficulty performing the same number of ADLs at baseline and follow-up, and worsened ADL impairment as difficulty performing an increased number of ADLs from baseline to follow-up. We defined IADL impairment similarly. We used multivariable regression models to identify risk factors for persistent or worsened functional impairment.

RESULTS: Overall, 204 of 250 participants completed follow-up interviews. Mean age was 56 years, 18 % were women, and 40 % were black. At baseline, 65 participants reported impairment in 1 or more ADLs. Of these 65 participants, 21 (32 %) had persistent ADL impairment one year later and 11 (17 %) had worsened impairment. Among the 32 participants with persistent or worsened ADL impairment, the individual impairments often changed over time: one-third of participants had improvement in the original impairment but onset of 1 or more other impairments. Results were similar for IADLs. At baseline, 119 participants reported impairment in 1 or more IADLs, of whom 30 (25 %) had persistent impairment and 31 (26 %) had worsened impairment. In multivariable analyses, demographics, medical comorbidity, substance use, and health services use were not associated with persistent or worsened versus improved functional impairment.

CONCLUSIONS: Although functional impairment was transient in some older homeless adults, it persisted or worsened in many others. These findings suggest that housing solutions and services for older homeless adults must be tailored to benefit individuals with differing functional trajectories.

THE EFFECT OF ADVANCE DIRECTIVE COMPLETION ON HOSPITAL CARE AMONG HOMELESS PERSONS: A PROSPECTIVE COHORT STUDY

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BACKGROUND: End-of-life care planning is important for homeless individuals because they experience high morbidity and mortality. A previous study has shown that many homeless persons are willing to complete an advance directive, but the impact of advance directives on subsequent hospital care has not been examined in this population. The objective of this study was to determine if chronically homeless individuals who completed an advance directive through a shelter-based intervention were more likely to have the information in this document (treatment preferences and/or identification of a substitute decision maker) documented during hospitalizations over a 1-year follow-up period, compared to homeless individuals who did not complete an advance directive through the intervention.

METHODS: This prospective cohort study recruited 205 chronically homeless persons at a large men's shelter in Toronto, Ontario from April to June 2013. Participants were offered the opportunity to complete an advance directive through a one-on-one counselor guided intervention; 103 (50.2 %) completed an advance directive and gave permission

for the document to be made available to health care providers during future hospitalizations, and 102 (49.8 %) chose to not complete an advance directive. Extensive efforts were undertaken to make advance directives available to health care providers, including giving copies of advance directives to participants' primary care providers, informing clinicians at nearby hospitals of the initiative, and making advance directives available within a hospital information system. Medical records at the hospital that provides the majority of inpatient care for shelter residents were searched to identify all participants who were admitted during a 1-year follow-up period. Charts were reviewed independently by two reviewers who were blinded as to whether participants had completed an advance directive. The pre-defined primary outcome was documentation in the hospital chart that explicitly referenced the contents of an advance directive (treatment preferences and/or identification of a substitute decision maker). If a participant was hospitalized multiple times, documentation during any single hospitalization was considered sufficient. Chi-square analysis was used to compare the proportion of participants with a primary outcome among those who completed an advance directive vs. those who did not complete an advance directive. To account for possible differences in hospitalization rates in the two groups, the analysis was also conducted including only participants who were hospitalized during the follow-up period.

RESULTS: Hospitalization during the follow-up period occurred in 32 participants who completed an advance directive vs. 27 participants who did not complete an advance directive (31.1 vs. 26.5 %, $p=0.47$). The primary outcome occurred in 8 of 103 participants who completed an advance directive vs. 2 of 102 participants who did not complete an advance directive (7.8 vs. 2.0 %, $p=0.054$). Considering only individuals who were hospitalized during the follow-up period, the primary outcome occurred in 8 of 32 participants who completed an advance directive vs. 2 of 27 participants who did not complete an advance directive (25.0 vs. 7.4 %, $p=0.073$).

CONCLUSIONS: Among chronically homeless individuals, completion of an advance directive through a shelter-based intervention was associated with a higher probability of having information from an advance directive (treatment preferences and/or identification of a substitute decision maker) documented during hospitalizations over a 1-year follow-up period, but this association did not achieve statistical significance. The observation that only 25 % of homeless participants who completed an advance directive and were subsequently hospitalized had information from their advance directive recorded in their hospital chart indicates the need for improved information systems to make this information available to hospital-based health care providers, especially for marginalized populations.

THE EFFECT OF ATTENDING PRACTICE STYLE ON GENERIC MEDICATION PRESCRIBING BY RESIDENTS IN THE CLINIC SETTING

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BACKGROUND: With an increased emphasis on value-based care from policy makers, educators have been tasked to evaluate and improve resident competency in cost-effective care. Bedside teaching and modeling is an effective mechanism of knowledge transfer between attendings and their trainees; however, there is little empiric evidence of the role of attending physician supervision on resident practice in the area of low value care. Our objective was to study whether attendings' prescribing practices influence residents' prescribing of generic medications in the ambulatory clinic setting (adopting brand name vs. generic statin prescribing as a model of value-based care).

METHODS: A retrospective study of initial statin prescriptions by residents and attendings at five internal medicine resident practices in the Northeast, using electronic medical record data from July 2007 through November 2011. All in-person resident encounters were precepted and co-signed by an attending, and the attending-resident pairs were captured for each resident-written prescription for a patient. To measure the brand name statin prescribing rate for an attending, all initial statin prescriptions written by the attending physicians for their patients seen without a resident were evaluated. We estimated multivariable hierarchical logistic regression models to assess the independent effect of the supervising attending's rate of brand name prescribing in the preceding quarter on the likelihood of a resident prescribing a brand name statin in a patient encounter supervised by that attending. We adjusted for practice characteristics (practice site), patient characteristics (age, gender, comorbidities, tobacco use, and insurance type), and resident characteristics (year in training (PGY level), cohort year, and whether the resident was the patients' designated primary care provider) in the model. Predictive marginal effects of attending brand name statin prescribing rate in the preceding quarter on the probability that a brand name statin was prescribed by the resident were estimated at each PGY level.

RESULTS: The sample included 342 resident and 58 attending participants, accounting for 10,151 initial statin prescriptions including 3942 written by residents. Resident and attending physicians had similar brand name prescribing rates; residents on average wrote 24.9 % (SD 24.2 %) of new statin prescriptions for brand name medications, while attendings wrote for brand name statins in 25.7 % (SD 23.3 %) of encounters. A larger proportion (60.3 %) of generic statin prescriptions was written under the supervision of attendings with <20 % brand name prescribing rate for the previous quarter, while residents supervised by attendings with ≥ 20 % brand name prescribing rate prescribed a larger proportion (78.0 %) of brand name statins ($p < 0.001$). After adjusting for institutional, provider, and patient characteristics, attending brand name prescribing rate in the quarter prior to the encounter was associated with the odds of a PGY1 resident prescribing a brand name statin (adjusted odds ratios [aOR] ranging from 2.26, 95 % CI 1.34–3.81, $p = 0.002$, for attendings who prescribed brand name statins 40–59 % of the time, to aOR 3.40, 95 % CI 1.10–10.50, $p = 0.034$, for attendings who prescribed brand name statins at least 80 % of the time, compared to attendings who prescribed brand name statins <20 % of the time). There was no relationship between attending and resident brand name prescribing for PGY2 or PGY3 residents. For PGY1 residents, the probability of a resident prescribing a brand name statin ranged from 22.6 % (95 % CI 17.3 %–28.0 %, $p < 0.001$) for residents supervised by an attending who prescribed <20 % brand name statins in previous quarter to 41.6 % (95 % CI 24.6 %–58.5 %, $p < 0.001$) for residents supervised by an attending who prescribed at least 80 % brand name statins in previous quarter.

CONCLUSIONS: Our findings provide evidence of attending effect on resident practice of one specific example of low-value care. The high variation in generic prescribing of statins in the academic setting points to room for improvement in generic prescribing by residents as well as their supervising attending physicians. These findings are important to medical educators as residency programs respond to the challenge of teaching cost-effective medicine and evaluating residents in this competency.

THE EFFECT OF HOSPITAL-ACQUIRED ANEMIA ON 30-DAY READMISSION AND MORTALITY Anil N. Makam¹; Oanh K. Nguyen¹; Christopher Clark²; Song Zhang¹; Bin Xie²; Ruben Amarasingham^{2, 1}; Ethan Halm¹. ¹UT Southwestern Medical Center, Dallas, TX; ²Parkland Center for Clinical Innovation, Dallas, TX. (Tracking ID #2196285)

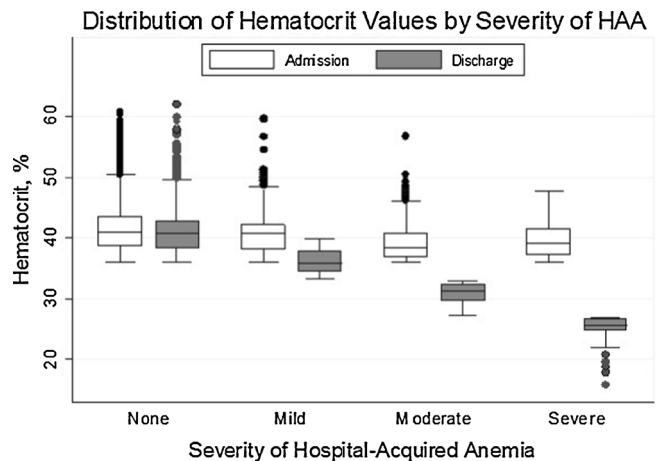
BACKGROUND: Hospital-acquired anemia (HAA) is associated with increased inpatient mortality and resource utilization. However, little is known about the effect of HAA on adverse outcomes following hospital discharge. We sought to describe the prevalence and patterns of HAA and examine the association between HAA and 30-day readmission and mortality.

METHODS: This is an observational study using EHR data from 6 hospitals in the Dallas-Fort Worth metroplex, including safety net, community, teaching, and non-teaching sites. We included hospital discharges from all internal medicine inpatient services among adults (≥ 18 years) between Nov. 1, 2009 and Oct. 30, 2010. We excluded patients with anemia (Hct < 36 % for women and < 40 % for men) within the first 24 h of hospitalization, missing a Hct value within the first 24 h and/or at the time of discharge, inpatient deaths, transferred to an acute care facility, or those leaving against medical advice. For patients with multiple admits, we included only the first one. We classified severity of HAA as either none (nadir Hct at time of discharge ≥ 36 % for women and ≥ 40 % for men); mild (women: 33 % Hct < 36 %; men: 33 % Hct < 40 %), moderate (27 % $<$ Hct ≤ 33 %), or severe (Hct ≤ 27 %). The primary outcome was a composite of death and non-elective readmission to any of 75 acute care hospitals in north Texas within 30 days, ascertained using an all payer regional hospitalization database. We used logistic regression to adjust for demographic, clinical, and healthcare utilization characteristics, accounting for clustering at the hospital level.

RESULTS: Of 10,962 patients, one-third (32.4 %) developed HAA (mild 21.1 %, moderate 9.9 %, severe 1.4 %; **Figure**). Only 2.8 % of patients received a blood transfusion during hospitalization; 0.6 % had an admission diagnosis of either GI bleed, anemia of any type, coagulopathy or hemorrhagic disorder. Patients with HAA had a higher frequency of adverse outcomes compared to patients without (mild 11 %, moderate 12.8 %, severe 16.0 % vs. 8.9 %, $p < .001$). Compared to those without HAA, having mild HAA was associated with an AOR of 1.10 (95 % CI, 0.94–1.28), moderate HAA with an AOR of 1.11 (95 % CI, 0.90–1.36) and severe HAA with an AOR of 1.34 (95 % CI, 0.86–2.09) for a 30-day adverse outcome.

CONCLUSIONS: HAA occurred in one-third of all hospitalizations and is associated with a potential severity-dependent increase in 30-day readmission and mortality, though the association was not statistically significant. Our study may have been underpowered to

detect a difference among those with severe HAA given the small number of patients. Further research is needed to examine the influence of HAA on 30-day adverse events and the factors that may lead to its development.



THE EFFECT OF OPIATE SUBSTITUTION THERAPY ON HEALTHCARE UTILIZATION AND ENGAGEMENT AMONG HIV-INFECTED PEOPLE WHO INJECT DRUGS IN UKRAINE Chethan Bachireddy¹; Jacob Izenberg²; Michael Soule³; Sergey Dvoryak⁴; Frederick L. Altice⁵. ¹Brigham and Women's Hospital, Boston, MA; ²UCSF, San Francisco, CA; ³MGH/McLean Hospital, Boston, MA; ⁴Ukrainian Institute on Public Health Policy, Kyiv, Ukraine; ⁵Yale University School of Medicine, New Haven, CT. (Tracking ID #2199349)

BACKGROUND: Eastern Europe and Central Asia face a rapidly escalating HIV epidemic driven by injection drug use (IDU). Key to stemming the tide of this epidemic is engaging HIV-infected people who inject drugs (PWID) in regular care and reducing their HIV infection risk through the expansion of opiate substitution therapy (OST) and antiretroviral therapy (ART). However, governments have been reluctant to scale up lifesaving OST due to stigma and cost. We evaluate the role of OST in engaging HIV-infected PWID in care and the effect of OST on utilization of medical services.

METHODS: Cross-sectional study of 296 randomly sampled HIV-infected opioid-dependent PWID conducted in healthcare clinics in 2010 across Ukraine. Participants asked about their healthcare utilization in the past 6 months and categorized as therapeutic on OST if they had taken OST for at least three consecutive months prior to the past 6 months or as not taking OST if they had not taken any OST in the past 6 months. Of the 296, 24 individuals were excluded based on having taken OST fewer than three consecutive months prior to the past 6 months.

RESULTS: The 65 % therapeutic on OST (177/272) were less likely to have income below the poverty line and live alone and more likely to be married or have gone to prison ($p < 0.05$). The two groups did not differ significantly in terms of age, gender, or education. Those therapeutic on OST had more years of opioid injection but were less likely to have injected in the past 30 days, to have engaged in polysubstance abuse, or to have overdosed on drugs in the past ($p < 0.01$). In the past 6 months, those therapeutic on OST were less likely to seek emergency care (72 % v 84 %, $p < 0.05$) and had fewer mean emergency care visits (2.77 v 4.57, $p < 0.02$) but similar mean ambulatory visits (1.78 v 0.59, $p = 0.11$) and hospitalizations (0.53 v 0.34, $p = 0.36$). Those therapeutic on OST were more likely to be engaged in HIV care, as evidenced by higher rates of ART (37 % v 26 %, $p = 0.08$), recent CD4 testing (82 % v 60 %, $p < 0.01$), and recent TB testing (95 % v 71 %, $p < 0.01$). The number of self-reported symptoms was higher in the non-OST group compared to those therapeutic on OST (10.46 v 7.75, $p < 0.01$). Limitations include the cross-sectional design and the potential for recall and social desirability biases.

CONCLUSIONS: Despite higher rates of incarceration and more years of opioid injection, those therapeutic on OST were much less likely to seek emergency care than those not on OST and much more likely to be engaged in HIV care with fewer overall symptoms. These results suggest that OST may decrease HIV transmission not only by limiting IDU but also by increasing engagement in HIV care.

THE EFFECT OF POINT-OF-CARE PRICE INFORMATION ON OUTPATIENT PHYSICIAN ORDERING BEHAVIOR Alyna T. Chien^{2, 3}; Carter Petty²; Meredith Rosenthal⁴; Thomas D. Sequist¹. ¹Partners Healthcare System, Boston, MA; ²Boston Children's Hospital, Boston, MA; ³Harvard Medical School, Boston, MA; ⁴Harvard School of Public Health, Boston, MA. (Tracking ID #2200024)

BACKGROUND: Physicians are critical targets for price transparency initiatives because they lack knowledge of the price of the health care they provide and have the expertise needed to distinguish when medical spending is necessary versus wasteful. Prior studies find that short-term provision of price information to trainees in hospital settings lowers ordering rates, but little is known about how longer-term exposure to price information affects primary care and specialist physicians in outpatient practice. We study the effect of providing two different forms of price information to physicians for four types of commonly-ordered outpatient procedures: advanced imaging (e.g., CTs, MRIs), cardiac testing (e.g., ECHOs, stress tests), endoscopy (e.g., colon, nasal), and other specialty procedures (e.g., electromyography, sleep studies).

METHODS: In January 2014, we block randomized 1388 primary care and specialist physicians practicing in 36 locations within a large multi-specialty group in Massachusetts. Arm 1 (control) was given the median amount paid to the group for commonly-ordered procedures via a written memo once at the beginning of the year. Arms 2 and 3 (intervention arms) then received price information through the electronic health record system throughout 2014. For each procedure, Arm 2 was given a single median price while Arm 3 was provided a pair of median prices corresponding to whether the procedure was performed “inside” or “outside” the organization. We obtained patient encounter and ordering data for pre-intervention and intervention years 2013–2014 from the multi-specialty group. We calculated the odds of an order being placed per health care encounter across all procedures and for each of the four procedure types using logistic regression. We assessed the intervention effect using an interaction term between intervention arm and study year, clustering on physicians.

RESULTS: Across all procedures, changes in Arm 2 (single median price) and Arm 3 (paired “inside” and “outside” median prices) were not significantly different from Arm 1 (control). However, arm effect varied by procedure type. For physicians in Arm 2, the adjusted odds of ordering were significantly lower for advanced imaging and other specialty procedures (AOR 0.98 [0.96, 0.99], 0.94 [0.92, 0.96], respectively); they were significantly higher for cardiac testing (AOR 1.24 [1.19, 1.28]), but there was no significant change for endoscopy. For physicians in Arm 3, the adjusted odds of ordering were significantly lower for endoscopy and other specialty procedures (AOR 0.75 [0.72, 0.78], 0.97 [0.95, 0.99], respectively), but significantly higher for advanced imaging and cardiac testing (AOR 1.02 [1.01, 1.04], 1.04 [1.01, 1.08], respectively).

CONCLUSIONS: Price information can have a mixed effect on primary care and specialist physicians in outpatient practice. It could have a lowering effect, but also a heightening one suggesting that revealed prices could be higher or lower than physicians expect depending on the type of procedure being ordered. Response to single median price information appears different from that to a pair of “inside” and “outside” prices. When changes were significant, the magnitude of the effect tended to be small but could still translate into substantial differences in spending across thousands of commonly-ordered outpatient procedures.

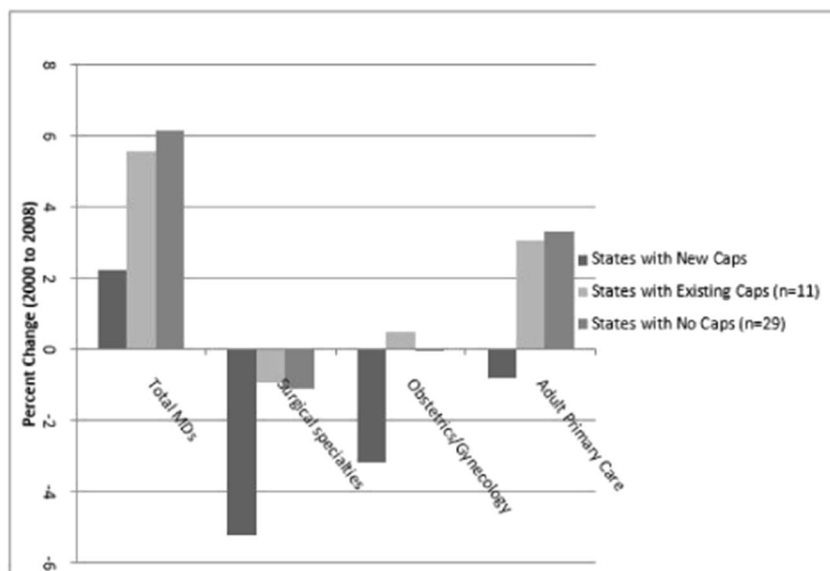
THE EFFECT OF RECENT MALPRACTICE REFORMS ON THE SUPPLY OF PHYSICIANS Tara F. Bishop¹; Jayme Mendelsohn²; Michael Pesko¹. ¹Weill Cornell Medical College, New York, NY; ²Bryn Mawr College, Bryn Mawr, PA. (Tracking ID #2194798)

BACKGROUND: Physician labor supply affects access to and quality of healthcare. According to the Association of American Medical Colleges, there will be a shortage of 45,000 primary care physicians and 46,000 surgeons and medical specialists by 2020. Physicians may choose to practice in states with favorable malpractice laws. We studied the effect of the most recent wave of malpractice reforms on physician supply.

METHODS: We performed a difference-in-difference analysis of states that had implemented new malpractice damages between 2000 and 2008. For state malpractice law information, we used the Database of State Tort Law Reforms Version 4 (DSTLR4), which is the most comprehensive dataset of state-level malpractice reforms from 1980 to 2010. For physician supply, we used data from the Area Resource File (ARF), which is a county-level database maintained by the U.S. Department of Health and Human Services’ Health Resources and Services Administration. Our main outcome variables were the total number of physicians per 100,000 residents and physicians in the fields of primary care, obstetrics/gynecology, and general surgery. We controlled for state, year, and state-level population characteristics.

RESULTS: Between 2000 and 2008, ten states instituted new damage caps. The number of physicians per 100,000 residents increased from 2000 to 2008 in all the states categories but the percent increase was lowest in states with new caps (2.2 % increase) versus states with existing caps (5.6 % increase) and states with no caps (6.2 % increase). The number of surgeons per 100,000 residents decreased in all state categories—the decrease was lowest in states with existing caps (0.9 % decrease) and no caps (1.1 % decrease) than in states with new caps (5.2 % decrease). The number of obstetricians/gynecologists per 100,000 residents increased in states with existing caps (0.5 % increase) but decreased in states with no caps (0.1 % decrease) and states with new caps (3.2 % decrease). The number of primary care physicians per 100,000 residents increased in states with existing caps (3.1 % increase) and in states with no caps (3.3 % increase) but decreased in states with new caps (0.8 % decrease). In sum, states that implemented new damage caps had the lowest increases in physician supply and, for the fields of surgery and obstetrics/gynecology, the highest decreases in physician supply. In regression analysis, we found a statistically significant decrease of 6.1 physicians per 100,000 residents (95 % confidence interval [CI], −6.1 to −3.6, $p < 0.001$) and 1.7 primary care physicians per 100,000 residents (95 % CI, −2.7 to −0.6, $p = 0.002$) in states that implemented damage caps. There were no significant effects of malpractice caps on the number of surgeons or obstetricians/gynecologists in regression analysis.

CONCLUSIONS: We found that physician supply did not increase in states after they implemented damage caps. Our findings suggest that damage caps are not an effective solution for states seeking to reverse declining physician labor supply.



THE EFFECTIVENESS OF SYMPTOM CHECKERS FOR SELF-DIAGNOSIS AND TRIAGE: BEYOND “GOOGLING” SYMPTOMS Hannah Semigran²; Jeffrey A. Linder^{1,2}; Courtney Gidengil^{3,4}; Ateeq Mehrotra^{2,5}. ¹Brigham and Women's Hospital, Boston, MA; ²Harvard Medical School, Boston, MA; ³RAND Corporation, Boston, MA; ⁴Children's Hospital, Boston, MA; ⁵Beth Israel Deaconess Medical Center, Boston, MA. (Tracking ID #2197500)

BACKGROUND: Over one-third of US adults use the internet for self-diagnosis. Symptom checkers are online tools which use computer algorithms to help patients with self-diagnosis and/or self-triage. Symptom checkers have been introduced by a range of organizations including insurers, physician specialty societies, and private companies. The performance of popular symptom checkers has not been previously assessed. Our objective was to determine the effectiveness of symptom checkers in diagnostic and triage advice.

METHODS: We performed an audit study of 20 symptom checkers using 45 standardized patient (SP) vignettes divided equally into three categories based on the urgency of the problem: emergent care required (e.g., pulmonary embolism), non-emergent care required (e.g., otitis media), and self-care reasonable (e.g., viral upper respiratory illness). The symptoms for each of the 45 SP vignettes were entered into each symptom checker. For symptom checkers that provided a diagnosis, the main outcome was whether the symptom checker listed the correct diagnosis first or in list of potential diagnoses ($n=650$ SP evaluations). For symptom checkers that provided a triage recommendation, the main outcome was whether the symptom checker properly recommended emergent care, non-emergent care, or self-care ($n=516$ SP evaluations).

RESULTS: The symptom checkers provided the correct diagnosis first in 33 % (95 % confidence interval [CI], 30-37 %) of SP evaluations, listed the correct diagnosis at all in 60 % (95 % CI, 56-63 %) of SP evaluations, and provided the appropriate triage advice in 56 % (95 % CI, 51-61 %) of SP evaluations. Triage performance varied by condition urgency, with appropriate triage advice provided in 80 % (95 % CI, 74-86 %) of emergent cases, 55 % (95 % CI, 47-62 %) of non-emergent cases, and 34 % (95 % CI, 27-41 %) of self-care cases ($P<0.001$). The range of appropriate triage advice provided by individual symptom checkers was 33 % (95 % CI, 19-48 %) to 78 % (95 % CI, 64-91 %) of SP evaluations.

CONCLUSIONS: Symptom checkers had deficits in both diagnosis and triage. Triage advice was generally risk-averse; symptom checkers encouraged users to seek care for conditions where self-care was reasonable.

THE EFFECTS OF A MULTI-FACETED MEDICATION RECONCILIATION QUALITY IMPROVEMENT INTERVENTION ON PATIENT SAFETY: FINAL RESULTS OF THE MARQUIS STUDY Jeffrey L. Schnipper^{6, 2}; Jason Stein⁷; Tosha B. Wettemeck^{4, 8}; Peter Kaboli^{3, 9}; Stephanie Mueller^{6, 2}; Amanda S. Mixon³; Stephanie Labonville⁶; Jacquelyn A. Minahan⁶; Elisabeth Burdick^{1, 6}; Endel John Orav⁶; Jenna Goldstein¹⁰; Nyryan V. Nolido⁶; Sunil Kripalani¹¹. ¹Brigham & Women, Boston, MA; ²Harvard Medical School, Boston, MA; ³Iowa City VAMC, Iowa City, IA; ⁴University of Wisconsin School of Medicine and Public Health, Madison, WI; ⁵VA Tennessee Valley Healthcare System and Vanderbilt University, Nashville, TN; ⁶Brigham and Women's Hospital, Boston, MA; ⁷Emory University School of Medicine, Atlanta, GA; ⁸University of Wisconsin Madison, Madison, WI; ⁹University of Iowa Hospitals and Clinics, Iowa City, IA; ¹⁰Society of Hospital Medicine, Philadelphia, PA; ¹¹Vanderbilt University Medical Center, Nashville, TN. (Tracking ID #2194915)

BACKGROUND: Unintentional medication discrepancies during hospitalization can contribute to patient harm. Discrepancies can be reduced by performing medication reconciliation; however, effective implementation is challenging. The goals of the Multi-Center Medication Reconciliation Quality Improvement Study (MARQUIS) were to operationalize best practices for inpatient medication reconciliation and test their effect on potentially harmful medication discrepancies.

METHODS: Five U.S. hospitals participated in a 2-year quality improvement (QI) study between September 2011 and July 2014. With the guidance of trained mentors and using standard QI principles, each site implemented at least one of 11 intervention components on some or all medical-surgical inpatient units. A toolkit and supplementary materials such as instructional videos and slide presentations described the design and implementation of these intervention components in detail. Mentors conducted monthly phone calls and two site visits during the intervention period. The primary outcome was the number of

potentially harmful unintentional medication discrepancies per patient. This was determined in approximately 22 randomly selected patients per month at each site during a 6-month baseline period and throughout the intervention. Trained on-site pharmacists took “gold standard” medication histories on these patients, compared these histories to admission and discharge medication orders, and identified and categorized all discrepancies. Trained physician adjudicators at each site determined the potential for harm of all unintentional discrepancies. To analyze the effect of the entire intervention on the primary outcome, we conducted an interrupted time series analysis using multivariable Poisson regression to detect both sudden improvement with initiation of the intervention and change in the temporal trend after initiation, adjusted for baseline temporal trends and baseline differences between intervention and any control units.

RESULTS: Across the five participating sites, 1479 patients were enrolled, including 548 patients during the baseline period and 931 patients during the intervention period. Implementation of the intervention as a whole was associated with a reduction in the number of potentially harmful discrepancies over time, beyond any baseline temporal trends: incidence rate ratio 0.89 per month (95 % CI 0.80 to 0.99), $p=0.03$. Of the 4 sites that implemented anywhere from 4 to 7 different intervention components during the study period, 3 sites saw reductions in their potentially harmful discrepancy rate. The site that saw an increase in their discrepancy rate implemented a new electronic medical record shortly after beginning the intervention.

CONCLUSIONS: Adoption of a multi-faceted medication reconciliation quality improvement initiative using a mentored implementation model was associated with a reduction in potentially harmful medication discrepancies over time.

THE EFFECTS OF IMPLEMENTING A PATIENT-CENTERED MEDICAL HOME MODEL ON EMERGENCY UTILIZATION IN A VA HEALTH CARE SETTING Ana Quinones¹; Sandra Joos²; Kyle D. Hart¹; Ana Rosales³; Nancy Perrin³; Devan Kansagara^{3, 4}. ¹OHSU, Portland, OR; ²Portland VA Medical Center, Portland, OR; ³VA Portland Health Care System, Portland, OR; ⁴Oregon Health and Science University, Portland, OR; ⁵Kaiser Permanente Center for Health Research, Portland, OR. (Tracking ID #2201320)

BACKGROUND: The patient-centered medical home (PCMH) model has garnered widespread interest, in part as a way to reduce unnecessary emergency room and hospital use by providing more patient-centered, coordinated and comprehensive care. During the 1990's, the Veterans Health Administration (VHA) instituted major healthcare transformations that touch on aspects of the PCMH model including the establishment of an electronic medical record, quality measurement, and a limited use of team-based care. In 2010, given remaining gaps in care, the VHA began a nationwide implementation of its version of PCMH called the Patient-Aligned Care Team (PACT) initiative. Five evaluation centers, called Demonstration Labs, were concurrently established to proactively examine PACT implementation. We report data from clinics in our Demonstration Lab comparing trends in emergency utilization outcomes before and after PACT implementation.

METHODS: The VA Portland Health Care System encompasses 11 clinics which treat approximately 80,000 outpatients. We used administrative data from the VHA Corporate Data Warehouse to create a longitudinal database from 2005 to 2014, organized in month-long snapshot periods. For each snapshot, we calculated the proportion of patients assigned to a given clinic that experienced one or more utilization events of interest (emergency room visits, hospital admissions, 30-day hospital readmissions). We conducted a time-series analysis to compare trends in utilization before and after PACT implementation. We excluded data during a six month implementation window following the official PACT start date in April 2010.

RESULTS: We had adequate data to establish stable baseline trends in utilization for 8 of the 11 clinics (3 of the clinics were too small to contribute reliable data). Over the first four years of PACT implementation, all clinics improved staffing ratios and 4 of 8 clinics reached recommended staffing ratios. However, 6 of 8 clinics had low levels of staffing stability (<0.5 on a staffing stability scale from 0 to 1). PACT implementation was not associated with reductions in emergency room (ER) visit or hospital admission rates in any clinic. The rates of ER visits were declining slightly (-0.01 to -0.02 % monthly) in 6 of 8 clinics over the 5 years prior to PACT implementation. One of the 8 clinics experienced reductions in readmission rates after PACT implementation (pre-PACT 0.2 %/month increase; post-PACT .5 %/month decrease; $p<0.001$).

CONCLUSIONS: We found that ER visit rates declined slightly in most clinics in the years prior to PACT implementation. However, we found no consistent evidence that PACT implementation was associated with further reductions in ER or hospital utilization. It is unclear whether these results reflect limits in the ability of PACT to impact utilization outcomes, or the relative immaturity of PACT implementation at this stage. It will be important to track utilization outcomes as important elements such as staffing stability improve. We are currently conducting qualitative analyses as well to better understand facilitators and barriers to PACT implementation that may help further explain our findings.

THE FAMILY NAVIGATOR: PILOT STUDY OF A NEW ROLE TO SUPPORT FAMILY COMMUNICATION IN THE ICU Alexia M. Torke^{3,4}; Lucia D. Wocia⁴; Shelley A. Johns^{3,1}; Christopher M. Callahan^{3,1}; Greg A. Sachs^{3,1}; Susan M. Perkins^{1,2}; Mary Austrom¹; Richard M. Frankel^{1,5}; Babar Khan³; James E. Slaven²; Kianna Montz³; Emily Burke³. ¹Indiana University, Indianapolis, IN; ²Indiana University School of Medicine, Indianapolis, IN; ³Regenstrief, Indianapolis, IN; ⁴Fairbanks Center for Medical Ethics, Indianapolis, IN; ⁵Richard L. Roudebush VA Medical Center, Indianapolis, IN. (Tracking ID #2197536)

BACKGROUND: In the intensive care unit (ICU), family members suffer from high levels of psychological distress. Inadequate communication with clinicians and challenges in decision making are two important sources of distress that are amenable to intervention. New interventions are needed that support family surrogate decision makers with communication and decision making. We developed and pilot tested the Family Navigator (FN), a new nursing role to address surrogates' unmet communication and support needs in order to improve decision making and surrogate outcomes.

METHODS: The setting was the medical ICU of a tertiary referral center. The intervention was developed based on prior research and an interdisciplinary team model involving close collaboration with ICU nurses, physicians and social workers who met weekly to develop the intervention. The team considered interventions that met 6 communication needed identified by family surrogates in our prior research (Table). The intervention included a semi-structured initial interview with the FN to establish rapport and daily contact to provide information and assess needs. The FN was fully integrated into the ICU team and rounded with them daily. She collected specific information during rounds, including changes in condition, overall goals of care and daily goals. The FN used this information to provide a daily update to the family regarding the patient's clinical condition. The FN also selected educational/emotional support modules that she delivered to the family member(s) based on needs identified during the initial interview and the daily contacts. The FN was a registered nurse with extensive ICU experience who underwent a 2 week training program. We conducted a single-site, randomized pilot study to test feasibility and acceptability. Patient/Surrogate dyads were eligible if the patient had severe cognitive impairment based on coma, sedation or the Short Portable Mental Status Questionnaire and the surrogate could be enrolled within 3 days of ICU admission.

RESULTS: We identified 69 eligible patient/surrogate dyads and enrolled 26 (13 in each group). Patients were 58 % female, 27 % African American and 73 % white. Surrogates were spouses (54 %) and children (31 %). All intervention surrogates completed the introductory interview, and all were contacted by the FN on greater than 90 % of eligible study days. The most frequently used educational modules were: code status (delivered to 92 % of surrogates); making a medical decision (77 %), and withdrawal of life sustaining therapy (69 %). In follow-up interviews, all subjects agreed or strongly agreed that they would recommend the FN to other families. One participant said, "The support and the overall counseling was comforting and gave optimism and relief. She talked to my kids, which helped them relax." Clinicians were also highly positive. One physician said, "For family members, it helped them understand better what was going on with the (patient). It helped us to establish the goals of care much faster. For staff, it decreased our frustration." Clinicians did not believe they communicated any less with families because of the intervention. As one said, "On the contrary, I think it was better communication. More than usual because of her presence."

CONCLUSIONS: A nurse-led intervention to support surrogates is feasible and well received by surrogates. This intervention was integrated fully into the system of care and met needs previously identified by ICU family members. Future research will test the impact of the intervention on family well-being and decision making in a larger randomized controlled trial.

Elements of Communication

Element of Communication	Problem	FN Intervention
Communication Timing	Lack of timely updates, delays in communication, sporadic and random timing of contact with clinicians, based on rounds, schedules and family availability	Planned daily contact with the surrogate, individualized time and mode (phone, in-person) based on individual surrogate needs Coordinate family meetings with clinical team
Information Disclosure	Inadequate provision of information about the patient's condition, treatment and prognosis	Provide or facilitate regular clinical updates about the diagnosis and medical care Protocols about key decisions and options (goals of care, resuscitation status, hospice) Provide written resource documents Use teach back strategies to reinforce information
Emotional/spiritual support	Strong or overwhelming emotions and unmet spiritual needs that interfere with coping and decision making	Provide emotional and spiritual support, involves other resources as needed (chaplain)
Treated with Respect	Surrogates sometimes feel their role is as a family member is not understood or respected	Active listening, use of the VALUE framework
Surrogate Engagement/advocacy	Lack of knowledge of how to navigate a complex environment; varying skill levels at advocating for patient or family needs	Educates the family on hospital resources and how to navigate the hospital and health care system Coordinates inpatient care and discharge transitions Post-discharge phone calls to manage care and facilitate follow-up
Strength of Relationships	Fragmented relationships with clinicians	Form an ongoing relationship with the surrogate

THE FREQUENCY OF ATTENDING-LED DISCUSSION OF TEST ORDERING PRINCIPLES DURING INTERNAL MEDICINE WARDS ROUNDS Cason Pierce^{1,4}; Daniel Ozzello⁴; Angela Keniston²; Chad Stickrath³. ¹Denver Health, Denver, CO; ²Denver Health and Hospital Authority, Denver, CO; ³Denver VA Medical Center, Denver, CO; ⁴University of Colorado, Denver, CO. (Tracking ID #2197468)

BACKGROUND: Teaching rounds play a central role in the education of medical trainees. Beyond transmitting medical knowledge, they allow attending physicians to inculcate important behaviors through role modeling. In the last few years, policymakers and medical educators have stressed the importance of educating future practitioners about cost consciousness and the provision of high value care. Recognizing that the topic of high value care is relatively new in medical education, we sought to quantify the frequency with which attending physicians lead team discussion about test ordering principles.

METHODS: As part of a larger study examining the effects of a faculty seminar on the teaching behaviors of attending physicians during team rounds, we collected data on the frequency with which faculty discussed test ordering principles with their teaching teams. All observations occurred at either Denver Health, a safety-net teaching hospital in Denver, Colorado, or the University of Colorado, a tertiary academic center in Aurora, Colorado. Both hospitals are University of Colorado affiliates. Teaching teams always consisted of one attending, one resident, and one intern. Teams usually included one third and one fourth year medical student. Separate, paid fourth year medical students were trained to be non-participant observers of faculty-led team rounds on the internal medicine wards at these two sites. The student observers used a standardized instrument to classify for each patient discussed whether or not the attending asked any member of the team: 1) If a diagnostic test other than a complete blood count, basic metabolic panel, hepatic panel, or coagulation panel had previously been performed on the same patient 2) Whether the results of any ordered diagnostic test would affect patient care 3) Whether a discussed test result represented a false positive or whether a diagnostic study under consideration might result in a false positive 4) Whether the patient would suffer any short-term harm if a test

was not ordered 5) Whether the team considered the patient's preferences in ordering a diagnostic study. In addition, we recorded for each patient encounter the total time discussing the care plan, the total time spent at the patient's bedside, and whether a patient was on the day of observation "new" or "already known" to the team. Observations about the discussion of test ordering were scored as "0" (did not occur) or "1" (did occur). We aggregated data from all encounters separately for each of the five questions above. We then performed secondary analysis to see whether there were frequency differences between new and known patients and whether the percentage of time at the bedside correlated with frequency of discussion about test ordering principles.

RESULTS: Observations occurred between December 2013 and December 2014. A total of 16 rounding days led by 15 different attending physicians were observed for a total of 159 unique patient encounters. Eleven rounding day observations occurred at Denver Health and five at the University of Colorado. Results are shown in table 1 below. Overall, rates at which attending physicians discussed test ordering were very low. Across all 159 observed patient encounters, the frequency ranged from 1.89 % for discussion about short-term harm to 13.84 % for whether a test affected care. For patients who were "new" to the team, there was a trend toward more frequent discussion of whether tests affected care, but this trend was not statistically significant ($p=.066$). There was no clear relationship between time spent at the bedside and the likelihood of discussion about test ordering practices in any of the five defined categories.

CONCLUSIONS: In our study that involved direct observation of attending teaching for 159 patient encounters at two hospitals within the same academic training center, the frequency with which test ordering principles were discussed was very low. In the vast majority of cases—greater than 75 %—the attending physician did not engage the team in any discussion about test ordering principles or the implications on patient care. Although our study was limited by a relatively small sample size, we did not find a correlation between time spent at the bedside and greater frequency of discussion about test ordering. We also did not detect that these discussions happened more frequently for patients who were "new" to the team. While our study results need validation at more centers, they suggest the principles of high value care are not being widely taught during team rounds in internal medicine. Efforts to increase trainee exposure to the principles of high value care during team rounds may require targeted faculty development.

Frequency of Occurrence of Discussion About Test Ordering Principles

	Previously done?	Affect care?	False Positive?	Short-term harm?	Patient preference?
All patients	6.33 %	13.84 %	3.14 %	1.89 %	3.14 %
New patients	9.09 %	23.53 %	2.94 %	2.94 %	5.88 %
Old patients	5.93 %	11.86 %	3.39 %	1.69 %	2.54 %

THE HEPATITIS C VIRUS CASCADE AT AN URBAN POST-INCARCERATION TRANSITIONS CLINIC Laura C. Hawks¹; Brianna L. Norton³; Chinazo Cunningham²; Aaron D. Fox³. ¹Albert Einstein College of Medicine, Bronx, NY; ²Albert Einstein College of Medicine & Montefiore Medical Center, Bronx, NY; ³Montefiore Medical Center, Bronx, NY. (Tracking ID #2196502)

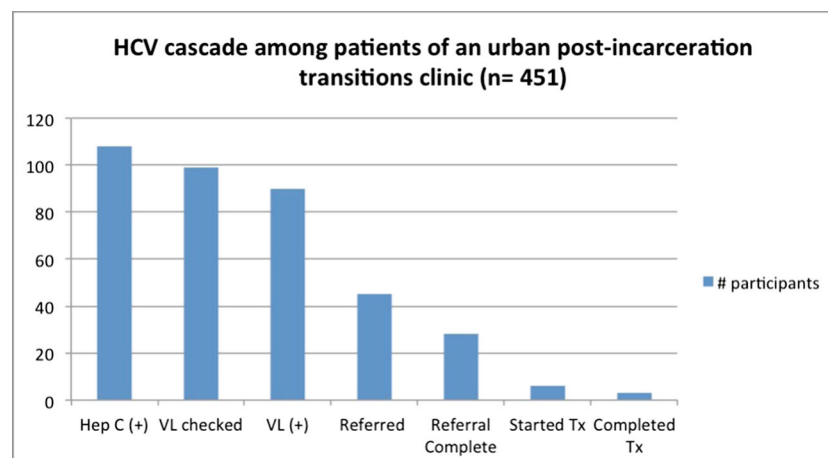
BACKGROUND: In the United States, Hepatitis C Virus (HCV) infection is a public health crisis that causes more annual deaths than HIV (15,106 vs. 12,704 in 2007). HCV

infection mostly affects marginalized groups such as injection drug users and criminal justice populations. Among prison inmates, HCV infection rates can be 23-fold that of the general population. Transitions clinics, which provide care to individuals following release from jail or prison, target this population, but it is unknown whether these clinics facilitate treatment of chronic HCV. New medications with higher cure rates and fewer side effects than previous regimens create an opportunity to address the HCV crisis, but it is estimated that only 9 % of Americans with chronic HCV will ever achieve cure. The HCV treatment cascade is a model that describes the steps necessary to identify and treat HCV infection. We used the HCV cascade to identify gaps in care for patients at an urban transitions clinic, which could inform future interventions to improve HCV treatment and cure rates.

METHODS: We conducted a retrospective cohort study reviewing electronic health records for formerly incarcerated individuals who received medical care at the Bronx Transitions Clinic (BTC) between July 2009 and October 2014. Subjects were all patients of the BTC, which is located in a federally qualified health center (FQHC) and receives referrals from a community-based criminal justice organization. Clinical and sociodemographic data was extracted from electronic health records using a standardized data collection tool. Steps of the HCV treatment cascade were based on prior published data. These measures included the proportion of patients who were screened (assessment of anti-HCV antibodies, yes/no), chronically infected (presence of HCV RNA > 75 IU/mL, yes/no), referred to a specialist (referral made, yes/no), completed referral (specialist evaluation, yes/no), initiated treatment (documented prescription, yes/no), and completed treatment with cure (post-treatment HCV RNA < 75 IU/mL, yes/no). The reason for discontinuation of care was determined by consensus among authors based on documented clinical data and review of an online New York State Department of Corrections database.

RESULTS: Of 451 BTC patients, 317 (70 %) were screened for HCV, and 108 (34 %) tested positive for HCV. Median age was 50, and the majority were male (93 %), Hispanic non-Black (62 %), and had Medicaid (97 %). Of the 108 patients with serologic evidence of HCV infection, 99 (92 %) were evaluated for HCV viremia and 90 (83 %) had chronic HCV infection. Of these 90 with chronic HCV, 45 (50 %) were referred to an HCV specialist, 28 (31 %) completed the referral, 6 (7 %) initiated treatment, and 3 (3 %) were cured. Reasons for discontinuation of care were established for all participants. Of the 45 who were referred to a HCV specialist, 17 (38 %) did not complete the referral; the most common reasons were re-incarceration (6) and loss to follow-up (6). Of the 28 participants who completed specialist referral, 22 (79 %) failed to initiate treatment; this was most commonly due to: waiting for availability of new medications (10) or undergoing additional evaluation (7).

CONCLUSIONS: Among patients of an urban post-incarceration transitions clinic, chronic HCV infection was common but few completed treatment and achieved cure. The majority of patients lost contact with the treatment cascade before they could be considered for antiviral therapy. Referral to a specialist was a major gap in care with approximately one-third lost to follow-up and one-third re-incarcerated before specialist evaluation. With the availability of new highly-effective medications, cure of HCV is a realistic goal, but first barriers to care must be addressed. Broader interventions to help individuals achieve stability following release from jail or prison are necessary to encourage continuity of medical care. Integrating HCV specialists within FQHCs or training primary care physicians to provide HCV care could obviate the need for specialist referral. However, the high rates of loss to follow-up and re-incarceration also suggest that some barriers to care for criminal justice populations may be outside of the realm of the health care system.



THE HIDDEN CURRICULUM IN HIGH-VALUE CARE EDUCATION: RESIDENT-PERCEIVED BARRIERS TO PRACTICING HIGH VALUE CARE IN A TRAINING ENVIRONMENT Maggie K. Benson¹; Anna K. Donovan²; Megan Hamm²; Susan Zickmund²; Melissa McNeil¹. ¹University of Pittsburgh Medical Center, Pittsburgh, PA; ²University of Pittsburgh School of Medicine, Pittsburgh, PA. (Tracking ID #2196705)

BACKGROUND: Healthcare professionals have embraced the concept of high-value care (HVC) to eliminate the medical and financial harms of unnecessary care. Formal curricular interventions for physicians in training have been developed, but there has been limited investigation into residents' barriers to practicing HVC. In this qualitative study we sought to elicit resident-perceived barriers to HVC in academic and community training environments.

METHODS: Six focus groups with internal medicine, transitional and preliminary interns and internal medicine residents were held in the spring of 2014. Four groups were held at a tertiary academic medical center, and two at a community affiliate site. Groups were stratified by training level. The study team created a question script that was used by an experienced facilitator to lead all groups. The focus groups ranged in size from 7 to 13 participants. The 60-min discussions were audio-recorded and transcribed verbatim. Using the Editing approach to qualitative analysis developed by Crabtree and Miller, a codebook was developed by a qualitative expert and the principle investigator. Two coders independently applied the codes to the focus group transcripts using ATLAS.ti (Scientific Software, Berlin Germany) software. After coding, discrepancies between coders were adjudicated until agreement was achieved. The original coding files prior to adjudication were used to calculate intercoder reliability. The mean Kappa statistics was 0.85.

RESULTS: Fifty-three trainees (26 interns and 27 upper level residents) participated. Thirty-six residents were in training at the tertiary academic center, and seventeen at the community affiliate site. The majority of trainees at the academic medical center had completed at least one rotation with the Veterans Affairs Hospital System. The most common barriers to emerge were: (1) patient expectations, (2) the influence of subspecialist and attending physicians, (3) the lack of cost transparency, (4) pressures for efficiency, and (5) fear of missing a diagnosis. First, residents were concerned that not meeting patient expectations for resource-intensive healthcare would negatively impact the doctor-patient relationship and physician performance measures. One resident stated, "I think, unfortunately, patients associate more tests with better doctors. If you reassure them, even if you have a great relationship, they'll think 'Oh, my doctor didn't care.'" Second, residents felt generalists were more cognizant of HVC than subspecialists, and this difference in practice created a conflict for trainees. One resident described "hostility and tension" as a result of not following subspecialist recommendations that were perceived as low-value. Others acknowledged difficulty in communicating differing physician recommendations to patients. The impact of the medical hierarchy also extended to supervising generalist physicians. "I think we are empowered to state our points, but ultimately we just end up doing what someone superior wants us to do." Third, residents had difficulty identifying costs of care and were most concerned with how cost might impact patients, in contrast to society in general. Simply stated, one said, "The biggest obstacle to talking about cost is that we don't know the cost." Another explained, "It's Monopoly money. This \$90,000 bill? That was the charge, but that's not what [the patient] is going to pay." Fourth, pressures for efficiency were cited as limited time to: research evidence-based practice, investigate cost, and engage in shared-decision making. "Getting people to understand that in medicine the tried and true stuff that's old and cheap is actually the best stuff...takes convincing and energy and the ability to communicate well. Sometimes we're overwhelmed and the time just isn't there." Finally, residents expressed fear of missing a diagnosis by showing restraint. Residents' past experiences in over-ordering created a cognitive bias that encouraged future over-ordering. "You are going to miss things when you practice high value care. A couple times I've actually had a result come back positive that I wasn't expecting and probably wouldn't have ordered it had I really been focused on high value care."

CONCLUSIONS: While the medical community has promoted HVC in the formal curriculum, trainees identify barriers in the hidden curriculum that hinder the practice of HVC. Residents are apprehensive about communicating with patients about avoidance of unnecessary care. Their discomfort with resolving differences with attendings and subspecialists indicates the hierarchical structure of medicine may undermine the academic mission, especially with regards to HVC. Future efforts to promote HVC in training environments should address the hidden curriculum by providing residents with easily-accessible, individualized cost information and cultivating an academic learning

environment that fosters dialogue about value between residents and both patients and physicians.

THE IMPACT OF AN AWARENESS CAMPAIGN ON HOSPITAL COST REDUCTION AND REDUNDANT LABORATORY TESTING IN A COMMUNITY TEACHING HOSPITAL Kofi M. Osei¹; Virginia Cody¹; Heather G. Huribal¹; Forugh Homayounrooz¹; Catherine Apaloo². ¹ST VINCENTS MEDICAL CENTER, Bridgeport, CT; ²Athens Regional Hospital, Athens, GA. (Tracking ID #2168748)

BACKGROUND: Introduction: Health care waste, estimated at \$690 billion dollars annually (2012) contributes to the rising cost of healthcare in the U.S. Unnecessary testing or diagnostic procedures accounts for between \$158 billion and \$226 billion (2012), with physicians being one of the drivers of this rising cost in healthcare. The ACP and AAIM have found ways to incorporate high value care (HVC) curricula in residency training programs to raise awareness of this issue. As part of a quality improvement (QI) project we assessed the impact of a computer monitor post-it to heighten awareness of HVC on cost savings and the number of laboratory tests ordered per hospital admission days. **Objectives:** (1) To determine the absolute cost reduction (ACR) in the average cost per hospital admission days due to CBC and BMP ordering before and after intervention. (2) To determine and compare the total number of laboratory tests—complete blood count [CBC] and basic metabolic panel [BMP]—ordered per hospital admission days, before and after the intervention. (3) To compare (1) and (2) amongst three physician groups, residents, hospitalists and private physicians

METHODS: Study Design: Prospective interventional QI study, conducted over a 6 month period. The first 3 months were pre-interventional and the subsequent 3 months post-interventional. **Study Site:** St Vincent's Medical Center (SVMC) a Quinnipiac University affiliated community hospital located in Bridgeport, CT. **Participants:** Physicians in the Dept. of Medicine were categorized into 3 groups: residents, hospitalists and private physicians. **Intervention:** A 4.5×5.5" post-it about careful laboratory and diagnostic testing was attached to every SVMC computer monitor used access the CPOE system over the entire interventional period. HVC education was provided during physician meetings and at resident noon conferences. **Ethics:** IRB approval was obtained **Data and Statistics:** Data was extracted from the SVMC database. The cost of CBC and BMP were per hospital charges. Poisson regression was used for unadjusted and adjusted analysis. Student's t-test used to obtain ACR. *p*-value<0.05 was considered significant. Stata 11 was used for the analysis.

RESULTS: Results: There were 19,380 orders for CBC and BMP during the pre-intervention period compared to 17,848 during the post-interventional period. The ACR was 8.32 (2.95–13.70), *p* 0.002 with an estimated cost savings of \$139,000 over the 3-month period. ACR was largest amongst the residents [ACR 17.14(4.12–30.16), *p* 0.01], hospitalists [ACR 13.17 (3.76–22.57), *p* 0.01], private physicians [ACR 4.85(–2.15–11.84), *p* 0.174]. The incidence rate ratio (IRR) for total number of labs per hospital admission days was 0.98 (0.92–1.05), *p* 0.64 after adjusting for physician groups. Subgroup analysis showed favorable trend for residents though not significant; [IRR 0.99 (0.89–1.10), *p* 0.870], hospitalist [1.04 (0.93–1.17), *p* 0.490] and private physicians [1.00 (0.93–1.08), *p* 1.00]. After adjusting for physician group CBC ordering pattern was not different pre or post interventional [IRR 1.01 (0.944–1.08), *p* 0.78], there was a non-significant favorable trend toward reduction in BMP orders after adjusting for physician group [RR 0.96(0.90–1.02), *p* 0.27]

CONCLUSIONS: Discussion: Our study demonstrates that a simple intervention such as post-it on HVC coupled with HVC awareness education can help reduce the cost of care. The greatest effect was seen in the resident group attesting that introducing HVC during training is likely to alter future ordering habits and help reduce the cost of care. Though there was a non-significant trend toward reduction in lab ordering, it was financially significant (**\$139,000**). Thus minor reductions in wasteful tests are likely to produce huge healthcare cost savings. Future research should include radiologic testing. Such research in the future should adjust for disease burden in the pre-interventional and post-interventional period. **Conclusion:** Low cost interventions such as post-its on HVC along with heightened HVC awareness is effective in reducing health care costs.

THE IMPACT OF AND INTERACTION BETWEEN CHRONIC OPIOID THERAPY AND BEHAVIORAL HEALTH COMORBIDITIES ON HOSPITAL, EMERGENCY DEPARTMENT, AND PRIMARY CARE UTILIZATION IN A LARGE INTEGRATED HEALTH SYSTEM Edward Ewen; Jennifer LeComte; Bailey C. Ingraham Lopresto; Sarah Schenck. Christiana Care Health System, Newark, DE. (Tracking ID #2196060)

BACKGROUND: There is little known about health care resource utilization in patients receiving chronic opioid therapy (COT) for chronic non-cancer pain. In addition, many of these patients have comorbid behavioral health conditions (BHC) that are already well associated with increased resource utilization. This study examines the potential association between COT and the utilization of hospital, emergency department (ED), and office resources and explores the interaction between COT and behavioral health conditions with regards to utilization in a large primary care network within an integrated health system.

METHODS: We performed a retrospective cohort analysis of all patients age 18 and older seen in a 12 month period (3/27/2013 to 3/27/2014) in one of 19 primary care practices. All demographic information, clinical observations, hospitalizations, ED visits, and office visit activity were obtained from a shared electronic health record. Chronic opioid use was defined as current use and continuous prescribing by the primary care provider of any opioid (excluding tramadol and propoxyphene) for 6 or more months during the study year. COT patients managed outside of the primary care setting were excluded from this analysis. BHCs were identified using problem list entries. Outcomes measures included the number of primary care office visits, total office clinical interactions (defined as office visits+patient calls to the office for reasons other than scheduling and billing inquiries), ED visits, and hospitalizations. A propensity score (PS) for the population overall was generated based on the probability to receive COT using a logistic regression model including 30 variables other than those indicating COT or a BHC. Those receiving COT were matched by PS to controls in a 1:5 ratio using greedy, nearest neighbor matching without replacement and a caliper width of .12 standard deviations of the logit of the estimated PS. Outcomes and description variables were compared using Chi-square or Mann-Whitney U tests in the matched population as appropriate. Visit counts were compared with negative binomial regression to overcome over dispersion in the outcome distribution while controlling for presence of behavioral health conditions and its interaction with chronic opioid therapy.

RESULTS: We identified 56196 eligible patients with 815 (1.4 %) receiving COT from their primary care provider. A total of 814 COT patients were successfully matched to 4 or 5 control patients ($n=4020$) for a total of 4832 study patients. There were no significant differences between populations in any of the 30 variables used to generate the PS. Over one-half of the matched patients had a behavioral health diagnosis ($n=2452$). Patients receiving COT were significantly more likely to have a BHC (70.0 vs. 46.8 %, $p<0.001$). There were a total of 20719 office visits (mean 4.29, SD 3.17), 64535 office interactions (mean 13.35, SD 12.05), 2977 ED visits (mean 0.62, SD 1.84), and 1338 hospitalizations (mean 0.28, SD 0.85) in this matched population. Both COT and BHC were associated with a greater number of office visits (COT: IRR 1.82, 95%CI 1.58–2.10 BHC: IRR 1.34, 95%CI 1.25–1.43) and office interactions (COT: IRR 2.76, 95%CI 2.40–3.16 BHC: IRR 1.56, 95%CI 1.46–1.66). The interaction between COT and BHC was not significant for office visits ($p=0.057$). However, when examining office clinical interactions among those with COT, those with a BHC had nearly 20 % more interactions than those without a comorbid BHC (IRR 1.19, 95%CI 1.02–1.39). COT and BHC were also associated with increased risk of hospitalization (COT: IRR 2.06, 95%CI 1.57–2.71 BHC: IRR 2.01, 95%CI 1.74–2.32). Among those receiving COT, those with a BHC were over 40 % more likely to be hospitalized (IRR 1.42, 95%CI 1.06–1.90). When examining ED utilization both COT and BHC were again associated with increased rates of utilization (COT: IRR 1.79, 95%CI 1.44–2.22 BHC: IRR 2.30, 95%CI 2.07–2.56). Among those receiving COT, those with a BHC were nearly 40 % more likely to have an ED visit (IRR 1.37, 95%CI 1.09–1.73).

CONCLUSIONS: Overall, both COT and BHC were associated with significantly increased utilization rates in all settings. In addition, significant interactions between COT and comorbid BHC were apparent in all but office visits. The impact of COT alone was most apparent in office interactions, which were over 2 ½ times greater in the COT group. The appropriate management of COT requires frequent reassessment and month-to-month prescription generation, which likely explains at least a portion of the excess office activity seen in this population. In those receiving COT, a comorbid BHC increased the risk of both hospital and ED utilization by approximately 40 %. Given the significant observed interactions between COT and comorbid BHCs, future efforts to address resource utilization in this population will also likely need to address the frequent comorbid behavioral health conditions that are so prevalent in this population.

THE IMPACT OF CHRONIC OPIOID THERAPY FOR NON-CANCER RELATED PAIN ON THE DELIVERY OF PREVENTIVE SERVICES AND CHRONIC DISEASE MANAGEMENT IN PRIMARY CARE PRACTICES Edward Ewen; Jennifer LeComte; Bailey C. Ingraham Lopresto; Sarah Schenck. Christiana Care Health System, Newark, DE. (Tracking ID #2195604)

BACKGROUND: The appropriate management of chronic opioid therapy (COT) for chronic non-cancer pain requires considerable time and attention to both the effect of

therapy and the risk of opioid misuse, addiction, and diversion. Given the visit time constraints of a typical primary care practice there is concern that the complexity of COT management could distract providers from other important tasks related to the management of chronic diseases and preventive services. This study examines the potential association between COT and selected outcomes for diabetes, hypertension, and preventive services in a large primary care network.

METHODS: We performed a retrospective cohort analysis of all patients age 18 and older seen in a 12 month period (3/27/2013 to 3/27/2014) in one of 19 primary care practices. All demographic information, clinical observations, and office visit activity were obtained from the office electronic medical record. Chronic opioid use was defined as current use and continuous prescribing by the primary care provider of any opioid (excluding tramadol and propoxyphene) for 6 or more months during the study year. COT patients managed outside of the primary care setting were excluded from this analysis. Subpopulations of those with diabetes and hypertension were identified using problem list entries. Outcomes measures included the number of office visits, HgbA1c, proportion with HgbA1c<9 %, LDL, proportion LDL<100, annual foot exams in diabetics, proportion with blood pressure<140/90 mmHg, proportion of biannual mammography screening in women age 50 to 75 years and proportion of those age 65 and older with documented pneumococcal vaccination. A propensity score (PS) was generated using a logistic regression model for the population overall and for each disease and demographic subpopulation based on the probability to receive COT. Those receiving COT were matched by PS to controls in a 1:5 ratio using greedy nearest neighbor matching without replacement and a caliper width of .12 standard deviations of the logit of the estimated PS. Outcomes and description variables were compared using Chi-square or Mann-Whitney U tests in the matched population as appropriate. The number of office visits over the year of follow-up were compared with negative binomial regression to account for over-dispersion observed in the count data.

RESULTS: We identified 56196 eligible patients with 815 (1.4 %) receiving COT from their primary care provider. All 815 COT patients were successfully matched to 3 to 5 ($n=4007$) control patients for a total of 4822 study patients. Subpopulations were matched with similar success. For diabetics ($n=7735$), 185 of 187 COT patients were matched to 874 controls; 477 of 479 COT patients were matched to 2321 controls for hypertensives ($n=22533$). The mammogram eligible ($n=14490$) population matched 284 of 287 COT patients to 1331 controls; and of those with age≥65 ($n=12336$) 215 of 217 COT patients matched to 1037 controls. After matching there were no significant differences between populations in any of the variables used to generate the PS. COT patients had significantly higher office utilization (6.6 vs 4.0, IRR=1.66, $p<0.001$) compared to the controls. Among diabetics there were no significant differences in proportion between COT and non-COT in HbA1c<9 % (73.5 % vs. 72.7 %, $p=0.86$), LDL<100 mg/dL (22.7 % vs. 19.2 %, $p=0.31$), BP control (70.8 % vs. 67.4 %, $p=0.39$), or annual foot exams (48.1 % vs. 53.3 %, $p=0.22$). In the hypertensive population there was no difference in proportion achieving BP control (63.3 % vs. 66.1 %, $p=0.24$). There were also no significant differences in eligible women receiving mammograms (69.4 % vs. 70.1 %, $p=0.83$), or patients age≥65 years receiving pneumococcal vaccine (89.8 % vs. 85.8 %, $p=0.15$).

CONCLUSIONS: We found no difference in observed outcomes with respect to preventive care, diabetes or hypertension management between those patients receiving COT and those without in our primary care population. COT patients were seen 70 % more frequently in the office, providing more opportunities to address chronic disease and preventive care issues. It is possible the increased frequency of interactions overcame the difficulty seen with addressing multiple competing problems at any given visit.

THE IMPACT OF PHYSICIANS' ONLINE BEHAVIOR ON PATIENT TRUST: A MULTISITE SURVEY STUDY Katherine C. Chretien⁵; Javad J. Fatollahi⁵; James Colbert³; Joy L. Lee²; Priyanka Agarwal¹; Lisa S. Lehmann¹. ¹Brigham and Women's Hospital, Boston, MA; ²Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ³Newton-Wellesley Hospital, Newton, MA; ⁴University of California, San Francisco, San Francisco, CA; ⁵Washington DC VAMC, Washington, DC. (Tracking ID #2200315)

BACKGROUND: Medical institutions and organizations have developed online professionalism policies and curricula to help guide physician behavior in the digital age. Prior research has gathered multiple stakeholders' perspectives on online professionalism including medical educators and administrators, practicing physicians, trainees, and to a much lesser extent, the public. These studies have shown differing opinions about how professionalism is defined online based on population studied, with medical educators having the most conservative views in general. Public views are poorly understood. Importantly, the impact of medical professionals' online behavior on patient trust—the foundation of the patient-physician relationship—is unknown.

METHODS: A cross-sectional survey study was conducted with patients at four academic primary care outpatient clinics in 3 US cities in 2014. Clinics were chosen for geographic and demographic diversity. The paper-based survey explored patients use of social media and technology for healthcare. One section asked respondents how their trust in their doctor might or might not change if they witnessed online scenarios involving their doctor. Scenarios were selected based on prior literature. Demographics including age, gender, education, race, ethnicity and health status were collected. Descriptive statistics were performed. Logistic regressions were performed with the dependent variable as change in trust and independent variables age, sex, race, education, and health status.

RESULTS: In total, 491 patients completed the survey. Response rate was 86 % for three sites; response rate could not be calculated for the fourth site (representing 21.2 % of total respondents). Respondents reported that they would have less trust if their doctor posted racist comments online (90 %), wrote a disrespectful patient narrative (84 %), appeared intoxicated in a photograph (73 %), or wrote profanity (55 %) (Table). The majority (85 %) reported no difference in trust if they saw a photograph of their doctor holding a glass of wine. Around a third (35 %) reported they would have more trust in their doctor if they saw a respectful patient narrative written by their doctor. Older respondents (≥ 65) were more likely to report less trust in their doctor after seeing a photograph of their doctor holding a glass of wine (OR 4.3, $p=0.03$), appearing intoxicated (OR 4.0, $p=0.003$), or posting profanity (OR 3.3, $p=0.004$) compared to those ages 18–34. More highly educated respondents were more likely to report less trust after seeing a racist post (OR 10–20 for those with college or graduate-level education versus high school education or less, $p<0.001$ for both) or after seeing a disrespectful patient narrative (OR 3.1–9.5, $p=0.03$ and $0<0.001$, respectively).

CONCLUSIONS: Physicians' online behavior may affect their patients' trust, at least as reported by patients responding to hypothetical situations. Whether this would change actual patient-physician relationships is unknown. Patient age and education may influence whether trust is influenced by physicians' online postings. Better understanding of how physicians' online presence impacts the patient-physician relationship, in both positive and negative directions, can help guide personal and institutional policy as well as inform educational efforts.

How would your trust in your doctor change if you saw the following online?

	Less trust N (%)	No difference in trust N (%)	More trust N (%)
A racist comment written by your doctor	416 (90)	43 (9)	3 (1)
A disrespectful story written by your doctor about a patient he/she saw in clinic (patient not identified by name)	390 (84)	67 (15)	6 (1)
A photo of your doctor appearing drunk.	338 (73)	120 (26)	5 (1)
A comment written by your doctor that included profanity.	249 (55)	201 (44)	7 (2)
A photo of your doctor holding a glass of wine.	61 (13)	389 (85)	10 (2)
A respectful story written by your doctor about a patient he/she saw in clinic (patient not identified by name)	57 (12)	245 (53)	149 (35)

*Total $N=491$; row totals may not equal total N due to item nonresponse.

THE IMPACT OF PRIMARY CARE REDESIGN ON RESIDENTS' EXPERIENCE IN CONTINUITY CLINIC Matthew Tobey³; Anthony H. Bu¹; Antoinette S. Peters²; Alyna T. Chien¹. ¹Harvard Medical School, Boston, MA; ²Harvard Medical School, Brookline, MA; ³Massachusetts General Hospital, Somerville, MA; ⁴Children's Hospital Boston, Boston, MA. (Tracking ID #2197828)

BACKGROUND: Continuity clinic (CC) serves as the cornerstone for generalist education during residency. The effect of primary care practice redesign—especially the establishment of team-based care—on residents' training experience remains largely unexplored. Exposure to enhanced teams and other aspects of redesign, such as population management, quality improvement and patient engagement, has the potential to improve resident training and to encourage more residents to pursue primary care careers, especially if CC becomes more enjoyable. Between 2012 and 2014, 19 Harvard Medical School-affiliated primary care training practices participated in the Academic Innovations Collaborative (AIC), a practice redesign initiative aimed at building highly effective teams, managing populations, and engaging patients. This study assessed the impact of the AIC on residents' educational experience of aspects of primary care redesign, as well as on CC enjoyment. Since the AIC devoted the most time to the improvement of team dynamics, the study also explored the relation of team dynamics to core outcomes.

METHODS: We conducted a pre/post intervention study treating each AIC year as an independent cross-section. We emailed an electronic survey link to all residents with CC at AIC practices (Year 1 $N=467$, Year 2 $N=451$). The survey inquired after exposure to population management (PM, 4 items), quality improvement (QI, 4 items), and patient engagement (PE, 2 items), as well as CC enjoyment (single item); these were taken to be the core outcomes. It also assessed team dynamics (TD, 29 items), resident supervision and workload (RSW, 6 items) and the existence of clinical protocols (CP, single item). All items were drawn from previously validated questionnaires; responses were gathered using 5-point Likerts (1=negative, 5=positive). Descriptive statistics examined rating levels and two-sided t-tests were employed to examine changes across years. The impacts of TD, RSW and CP on each of the four core variables were assessed using multivariate linear regression; the two years of the intervention were analyzed separately.

RESULTS: Response rates were 62 % ($N=289$) and 52 % ($N=235$) in Years 1 and 2, respectively; 119 individuals participated in both years. Residents' ratings of all domains related to redesign improved significantly over the two years: continuity clinic enjoyment (3.5 to 3.7, $p<0.02$); TD (3.4 to 3.6, $p<0.0001$); PM (3.5 to 3.7, $p<0.01$); QI (3.4 to 3.6, $p<0.01$); PE (3.5 to 3.7, $p<0.01$); CP (3.3 to 3.5, $p<0.02$). Ratings of resident supervision and workload in CC did not significantly change (3.3 to 3.4, $p=0.30$). In multivariate regression analysis, TD ratings were significantly associated with all four outcomes of interest (CC enjoyment, PM, QI and PE) during both years of the intervention (p values <0.001 except for PE, where $p<0.05$). Resident supervision and workload ratings were significantly associated with CC enjoyment and PM ratings in both years (p values <0.01). Residents' perception of the existence of clear clinical protocols was only significantly associated with QI ratings, and only in year 2.

CONCLUSIONS: Between the two years of a primary care practice redesign effort, resident ratings of team dynamics and exposure to population management, quality improvement, and patient engagement all improved, as did ratings of continuity clinic enjoyment. Enhanced team dynamics were associated with an improved resident training experience. These results suggest that practice redesign with a focus on establishing team-based care enhances resident learning and enjoyment of CC.

THE IMPACT OF SITTING OR STANDING AT THE BEDSIDE ON PATIENTS' RATING OF PHYSICIANS' COMMUNICATION SKILLS AND PERCEPTION OF TIME SPENT DURING MORNING ROUNDS: A CLUSTER RANDOMIZED TRIAL Alan C. Kwan²; Christy McKinney¹; Andrew A. White¹; Patrick Ufkes¹; Susan E. Merel¹. ¹University of Washington, Seattle, WA; ²Johns Hopkins Bayview Medical Center, Baltimore, MD. (Tracking ID #2153255)

BACKGROUND: Prior studies suggest that sitting at the bedside may improve patients' perceptions of physician's communication skills and increase the amount of time patients believe physicians spend with them, but this hypothesis has not been tested in the inpatient general medicine setting. We hypothesized that inpatients whose physician sat rather than stood would perceive the physician spent more time with them and would rate the physician's communication skills more highly as measured by questions modeled on the communication questions from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

METHODS: We conducted a cluster randomized clinical trial randomizing physicians to an alternating order of sitting and standing within a 7-day workweek. We enrolled patients being cared for by hospitalists on a general internal medicine service in an academic tertiary care hospital. Wall-mounted folding chairs were installed in all rooms on a 28-bed unit. Eligible subjects were English-speaking adults consenting to their own medical care and newly admitted or transferred from the ICU between June and December 2014. Physicians were randomly assigned to sit or stand during morning rounds in patients' rooms for the first 3 days of their workweek. The last 4 days they provided care using the other posture. Blocks of 4 weeks were used to randomize the sit/stand order to ensure an equal number of sit/stand days and to account for day of the week trends. Trained observers measured the length of the physician-patient interaction, asked both the physician and the patient to estimate the length of the interaction, and administered a written survey to the patient with questions about the physician's communication skills. We estimated descriptive statistics for physician and patient participants using means and proportions. We compared estimates of time spent between patients and providers and patients' satisfaction overall and according to whether the provider sat or stood. We used generalized estimating equations to generate p-values accounting for clustering of patients within provider. We will complete data collection in this ongoing project in June 2015.

RESULTS: Twelve physicians participated in the study; 88 % had been in practice less than 3 years and 67 % were female. Before entering the study, only 33 % of physicians reported usually sitting at bedside during morning rounds. Among 101 patients invited, 74 patients (73 %) participated; 77 % were Caucasian and 7 % Asian or Pacific Islander and

mean age was 51. An estimated 41 % of interactions were with sitting physicians. Overall, patients and providers estimated greater time spent (3 min 24 s more for patients and 52 s more for physicians) than was measured (both p -values < 0.001). When we stratified by the physician's posture, differences in time spent (Table 1) and on physician communication skills (Table 2) were in the direction hypothesized, but not statistically significant (all p -values > 0.05).

CONCLUSIONS: Physicians did not spend more time with the patient on rounds if they were seated. Consistent with prior studies, regardless of posture patients and physicians overestimated the amount of time spent on morning rounds, a finding that was statistically significant. Our findings that patients perceived providers spent more time with them, and patient perceptions of physicians communication were more favorable when providers sat rather than stood, were both consistent with our hypotheses and the supporting literature. That these findings were not statistically significant may be related to our sample size at this point in recruitment. Though our study is ongoing, these findings suggest sitting may be a simple potential strategy to improve patient satisfaction in an inpatient general medicine setting.

Table 1. Estimates of time spent and differences in time spent for interactions with a seated or standing provider.

* Time in minutes:seconds

	Seated (n=30) Mean*	Standing (n=44) Mean*	p-value
Recorded time spent in morning rounds	10:48	11:08	0.07
Patient's estimate of time spent	14:58	14:02	0.61
Physician's estimate of time spent	11:12	12:21	0.86
Difference between patient's estimate and recorded time	4:09	2:50	0.62
Difference between physician's estimate and recorded time	0:23	1:12	0.17

Table 2. Patients' responses to HCAHPS-adapted questions on physician communication skills.

	Seated (n=30) n (%)	Standing (n=44) n (%)	p-value
Today on rounds, did this doctor:			
Listen carefully to you?			
Never, sometimes or usually	2 (7)	11 (25)	0.06
Always	28 (93)	33 (75)	
Treat you with courtesy and respect?			
Never, sometimes or usually	0 (0)	5 (11)	**
Always	30 (100)	39 (89)	
Explain things in a way that was easy to understand?			
Never, sometimes or usually	6 (20)	11 (25)	0.62
Always	24 (80)	33 (75)	

** Not estimable due to zero value.

THE INFLUENCE OF DO-NOT-ATTEMPT-RESUSCITATE ORDERS ON NURSES' WILLINGNESS TO AGREE WITH PHYSICIANS' DECISION-MAKING IN JAPAN Eiji Hiraoka; Yosuke Homma; Yasuhiro Norisue. Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Japan. (Tracking ID #2179040)

BACKGROUND: A do-not attempt resuscitate (DNAR) order prohibits use of cardiopulmonary resuscitation (CPR) in the event of cardiopulmonary arrest. It should not be applied to any other interventions other than CPR. However, it has been reported that it affected physicians' decision making unrelated to CPR in the USA. We reported that patient DNAR status altered physician behavior pertaining to use of non-CPR procedures in Japan (reported in ACP Japan chapter 2014, unpublished data). We explored the influence of DNAR status on nurses' willingness to agree with physicians' medical decision-making in a variety of clinical contexts.

METHODS: The influence of DNAR status on nurses' willingness to agree with physicians' decision to pursue intervention was investigated at an urban community hospital in Chiba, Japan, and its two affiliating hospitals, using a case scenario-based questionnaire containing three scenarios: Case 1: advanced stage cancer; Case 2: advanced stage dementia; and Case 3: non-end stage heart failure. Each case was followed by questions assessing nurses' willingness to agree with physicians' decision making to pursue non-CPR interventions as well as CPR interventions. Examples of questions are "Would you agree with physicians' decision making to perform blood culture when sepsis

is suspected?" "Would you agree with physicians' decision making to transfer the patient to ICU?" Either of Case 1 and Case 2 has 13 questions. Case 3 has 11 questions. Rates of willingness to pursue interventions were calculated by number of nurses answering "Yes" for each procedure, divided by total number of nurses. The rate was statistically compared between the presence and absence of DNAR order by chi square analysis. For each scenario, relative rates (RR) were calculated based on the number of nurses willing to pursue a certain procedure in the presence of a DNAR order divided by those willing to in the absence of a DNAR order. Procedures were stratified by invasiveness (very invasive, moderately invasive, non-invasive), with RRs calculated in each to investigate the influence of invasiveness on decision-making. RRs were compared among 3 levels of invasiveness for each case scenario by using one way ANOVA.

RESULTS: Three hundred seventeen out of 423 nurses responded to the questionnaire. Thirty-one could not be analyzed because of incomplete answer. Therefore, 286 was analyzed (67 %). Pooling all procedures, fewer nurses were willing to agree with physicians' decision making to perform interventions in the presence of DNAR order than in its absence: Case 1, 89 % (absence of DNAR) vs. 46 % (presence of DNAR) ($p < 0.001$); Case 2, 83 % vs. 44 % ($p < 0.001$); and Case 3, 92 % vs 53 % ($p < 0.001$). The average RRs for non-invasive, moderately invasive, and very invasive interventions were 0.77, 0.34, and 0.09, respectively, in Case 1. Corresponding RRs for Case 2 were 0.77, 0.34, and 0.11; and 0.82, 0.47, and 0.15 in Case 3. The difference of the RRs between each groups were statistically significant ($p < 0.05$) for each case scenario. Discussion DNAR order is originally applied only to CPR in case of cardiopulmonary resuscitation. We demonstrated here that DNAR order affected nurses' willingness to agree with physicians' decision making of various procedures unrelated to CPR. We also showed that the influence increase linearly in the more invasive procedures. The reason may be that some nurses might believe that patients who want DNAR do not want to accept any procedure other than palliation as well. However, actually some patients would like to accept procedures unrelated CPR to prevent cardiopulmonary arrest and prolong advanced but stable stage of the disease and would like to accept DNAR at the time of cardiopulmonary arrest. Others would not like any invasive procedures and would like to accept only comfortable management. Therefore, we need to clarify whether they would like to undergo a certain procedure for each patient, especially when he or she requests for DNAR. Otherwise, some patients would receive a certain medical intervention adequately; some patients would not if DNAR is ordered.

CONCLUSIONS: DNAR status affects nurses' willingness to agree with physicians' decision making to perform a variety of non-CPR interventions. This association is linearly related to invasiveness. To ensure appropriate and equal care of patients with DNAR status, clear definitions of DNAR orders should be emphasized for nurses. Otherwise, DNAR order can be harmful.

THE LINK BETWEEN EDUCATION AND HEALTH: IT IS NOT WHAT YOU KNOW, BUT WHOM YOU KNOW Danielle Strom¹; Rebecca Dudovitz²; Lourdes R. Guerrero¹; Mitchell D. Wong². ¹David Geffen School of Medicine at UCLA, Los Angeles, CA; ²David Geffen School of Medicine at UCLA, Mitchell Wong, CA; ³University of California, Los Angeles, Los Angeles, CA; ⁴University of Michigan, Ann Arbor, MI. (Tracking ID #2199285)

BACKGROUND: Numerous observational studies have identified a strong link between education and health, suggesting that improving the quality of schools might be a way to improve population health and reduce health disparities. Almost all of these studies have examined years of schooling (attainment) and have consistently found substantially worse health behaviors and outcomes among high school drop-outs compared to high school graduates. In contrast, there have been almost no studies that have examined the association between health behaviors and outcomes with the quality of schooling (achievement). Further, association with risky peers likely reinforces both poor academic and health behaviors, potentially confounding this relationship. Thus, it is not known whether improving academic achievement will lead to improvements in health outcomes, particularly after accounting for peer influence.

METHODS: We analyzed data from the RISE Study, a natural experiment of students who had applied in 2007–2010 to attend one of the three high-performing charter public high schools in very low-income neighborhoods in Los Angeles and were selected for admission by random lottery. Students were excluded from the study if they went to other charter or private schools. The final sample of students in the study attended one of 3 study charter public schools or 69 traditional public high schools throughout Los Angeles. Subjects completed a 90-min face-to-face survey and reported their 30-day substance use and depression using the CES-D scale. Subjects answered sensitive questions about substance use using audio computer-assisted self-interviews (audio-CASI). We assessed the student's personal social network by having subjects name 20 of their closest network members (including friends and family members) and then answer follow-up questions

about the network member's age, relationship, and recent substance use. We grouped subjects into tertiles of peer group risk (low, medium, high) based on the proportion of the peer network who used alcohol and drugs in the last 30 days. We obtained student's California standard test scores from the California Department of Education as a measure of academic achievement.

RESULTS: Nine hundred twenty-nine students from grades 9–12 were included in the study. Most were Latino (84 %) or African American (12 %). Thirty-eight percent were native English speakers, and about half (50.7 %) of student's parents had graduated from high school. Almost all (90 %) of parents were employed. In multivariable analysis adjusting for grade, gender, race/ethnicity, language, parental education and employment, standard tests scores in math or English were not associated with 30-day alcohol use, 30-day marijuana use or depression. In contrast, peer network was strongly associated with substance use and depression. The adjusted OR was 15.0 ($p<0.001$) for 30-day alcohol use and 9.7 ($p<0.001$) for 30-day marijuana use if the subject had a high-risk peer group compared to having a low-risk peer group. There was almost no association between depression and the risk of the peer network.

CONCLUSIONS: Although previous studies have found much higher rates of depression and substance use among high school drop-outs compared to high school graduates, we did not find any association between these outcomes and academic achievement, measured by performance on standardized tests. It is possible that the effect of better education on health might occur later in life. Alternatively, improving academic achievement (through better schools) may not have a causal effect on health, but rather other factors, such as social networks and the risky behaviors of peers, are the root cause that leads to both poor educational and health outcomes. The present study suggests we do not fully understand how education contributes as a social determinant of health or how policies to improve school quality might influence population health.

THE MEDIATING AND EFFECT MODIFYING EFFECTS OF POSITIVE AFFECT IN THE RELATIONSHIP BETWEEN CHALLENGING CAREGIVING SITUATIONS AND PERCEIVED STRESS Albert Do¹; Allison Citro²; Jennifer Lyons²; Lisa Fredman². ¹Yale-New Haven Hospital, New Haven, CT; ²Boston University School of Public Health, Boston, MA. (Tracking ID #2196654)

BACKGROUND: Caring for a relative or close friend is often stressful, but the degree of stress has been found to vary with the care recipient's (CR) cognitive status and characteristics of the caregiving situation. Research on the disease-buffering effects of positive affect (PA) suggests that it may influence caregiver (CG) stress levels in these challenging situations. This study tested the hypothesis that PA is both a mediator and an effect modifier of the impact of three conditions on perceived stress in caregivers: caring for a person with dementia, living with the CR, and performing more instrumental and basic activities of daily living (I/ADLs) for the CR (i.e., high-intensity caregiving).

METHODS: The sample consisted of older women participants from the Caregiver-Study of Osteoporotic Fractures (CG-SOF). Participants had 5 interviews conducted over 9 years (1999–2009), with caregiver status assessment at each interview. These analyses pooled participants who were caregivers at each interview; thus, each participant could contribute from 1 to 5 data points over intervals from 1–3.8 years. High- versus low-intensity caregiving was determined by the median number of I/ADLs caregivers assisted the CR with at the first CG-SOF interview. A 3-category positive affect (PA) variable was created from the 20-item Center for Epidemiologic Studies-Depression Scale: participants who scored ≥ 16 were classified as depressed; those with lower scores were classified as low or high PA based on responses to four items on positive affect. Perceived stress was measured with the 14-item Perceived Stress Scale (PSS, possible range 0–56). Separate associations between each caregiving situation and perceived stress were evaluated using mixed effects regression models to account for multiple observations per subject. We performed the Sobel test for mediation of these associations by PA and used stratified analyses to assess effect modification.

RESULTS: There were 354 caregivers at the baseline interview, 272 at the 2nd, 206 at the 3rd, 67 at the 4th, and 42 at the 5th, resulting in 941 total observations. The mean age was 82.5 ± 3.7 years, 89 % were white, 54 % lived with the CR, 54 % were high-intensity caregivers, and 26 % cared for a person with dementia. The mean PSS score was 17.4 ± 7.7 . High-intensity caregivers, those who lived with the care recipient and who cared for a person with dementia reported significantly higher stress than their counterparts, adjusting for confounders ($\beta = 1.26, 3.26, 1.80$, respectively, $p < 0.01$). Inclusion of the PA variable in these models eliminated the association between caregiving intensity and perceived stress ($\beta = 0.58, p = 0.16$), and reduced associations with living with the CR and caring for a person with dementia ($\beta = 2.13$ and 1.38 , respectively, $p < 0.01$). Sobel tests indicated that PA mediated the association between caregiving intensity and perceived stress, but not other associations. In stratified analyses, living with the CR was associated with

significantly higher stress in caregivers with low PA or high PA, but not in those with depression (Table 1). Caring for a person with dementia was associated with higher stress in women with low PA, but not in the other affect groups, and high caregiving intensity was not significantly associated with perceived stress in any affect group.

CONCLUSIONS: Among older women caregivers, higher perceived stress associated with high intensity caregiving is mediated by PA. PA is also an effect modifier of the association between stressful caregiving situations and perceived stress. In practice, although such caregiving situations may not be preventable, interventions aiming to increase PA in caregivers may reduce psychological stress resulting from these caregiving situations. This, in turn, may serve to curtail fatigue and burnout in this rapidly growing and important population.

Table 1. Adjusted associations between caregiving situations and perceived stress, stratified by positive affect category in elderly caregivers of the Caregiver-Study of Osteoporotic Fractures study

Characteristic	Depressed (n=124) PSS Score ^{**} : β (SE)	Low PA (n=327)	High PA (n=490)
CG lives with CR ^a	1.27 (1.46)	2.10* (0.74)	2.09* (0.60)
CR with dementia ^a	2.10 [^] (1.17)	2.74* (0.82)	0.61 (0.67)
High-intensity caregiving ^b	1.19 (1.18)	1.32 (0.72)	0.09 (0.55)

CR=care recipient; PA=positive affect

a Associations adjusted for age, race, education status

b Associations adjusted for age, race, education status, living with CR and caring for person with dementia

^{**} Beta coefficients compare PSS among caregivers with characteristic to those without, i.e., adjusted PSS score was 2.10 points higher in caregivers with Low PA who lived with CR than in those who did not live with the CR.

* $p < 0.05$

[^] $p = 0.05$

THE MEDICAL ASSISTANT EXPERIENCE IN TEAM-BASED PRIMARY CARE: A QUALITATIVE STUDY Bethany S. Gerstein⁴; Alyna T. Chien²; Antoinette S. Peters³; Meredith Rosenthal¹; Sara Singer¹. ¹Harvard School of Public Health, Boston, MA; ²Boston Children's Hospital, Boston, MA; ³Harvard Medical School, Boston, MA; ⁴Harvard University, Cambridge, MA. (Tracking ID #2194023)

BACKGROUND: Medical Assistants (MAs) play a central role in team-based primary care. As more practices organize patient care around physician-led teams, MAs are taking on new responsibilities in an effort to maximize the time physicians spend on high-value clinical care. However, little research describes how the MA role is changing or how practices can most effectively manage the transition from support staff to team member. Between 2012 and 2014, as part of a learning collaborative called the Academic Innovations Collaborative (AIC), 19 Harvard-affiliated primary care practices transitioned from traditional practice to team-based care, empaneled all of their patients, expanded population management capacity, and reallocated tasks among their staff. The objective of this qualitative study is to understand, from the MA perspective: 1. how MA roles and experiences have changed during a transition to physician-led team-based care, and 2. what drives effective teamwork when care is team-based.

METHODS: In July 2014, we stratified practices according to levels of MA job satisfaction (available from a 2013 survey) and selected 3 practices within each of 3 levels (low, medium, high) for a total of 9 practices. Within each level, we selected practices for diversity in size and system affiliation, and included both community- and hospital-based offices. We then randomly selected 1 MA per clinical team ($n = 32$ total, ranging from 3 to 5 teams per practice) within each practice to participate in a 30-min semi-structured interview. If an MA did not respond or declined participation, we invited another MA from the same team. From August to November 2014, 1–2 interviewers audio-recorded interviews that asked MAs about their perspectives on changing tasks and responsibilities, facilitators and barriers to teamwork and communication, and the process of implementing team-based care. The interviewers also asked participants how their overall job satisfaction had changed over time using a 5-point response scale.

RESULTS: Data analysis is ongoing. Across 9 practices, 30 of 47 MAs recruited (64 %) agreed to participate; 27 of 30 participants were female. All but 3 interview participants had been at their practices for 2 years or more. A large majority of these participants (23 of

27) described being more satisfied with their jobs than before team-based care was implemented. MAs generally reported assuming additional responsibilities under team-based care; ill feelings about higher workloads were frequently offset by stronger relationships with patients and physicians, as well as a greater sense of efficacy and ownership of their work. MAs described the most positive experiences with teamwork and communication when they had consistent MA-physician dyads, adequate MA staffing, high physician commitment to team processes, and co-location with physicians and other team members. One barrier at several healthcare systems was a policy prohibiting MAs from performing some patient care tasks that they had been trained to perform.

CONCLUSIONS: MAs are often expected to play a larger role in delivering physician-led team-based care compared to traditional models of care delivery. Understanding what causes the MA experience to vary across practices may lead to broader insights about how best to implement primary care teams and to shift tasks to reduce the burden on physicians. Results suggest that the way practices structure and manage their teams matters; more research is needed to understand which factors matter most.

THE MODERATING EFFECT OF EMOTIONAL REGULATION ON THE ASSOCIATION BETWEEN CHRONIC STRESS AND CARDIOVASCULAR DISEASE RISK Brita Roy^{1, 2}; Carley Riley¹; Adam Hong¹; Rajita Sinha¹. ¹Yale University, New Haven, CT; ²Veterans Administration Health System, West Haven, CT. (Tracking ID #2198982)

BACKGROUND: Chronic stress is a risk factor for the development of cardiovascular disease, mediated via low-grade elevation of hormones and biomarkers of stress and inflammation, which are associated with higher incidence of myocardial infarction and stroke. Emotional regulation is the ability to modulate one's state or behavior in response to a given situation or stressor. We hypothesized that effective emotional regulation may mitigate the effect of chronic stress on cardiovascular risk.

METHODS: We used data from a cohort of 1032 community-dwelling adults followed by the Yale Stress Center Consortium. Chronic stress (CS) and cumulative adverse life events (CALE) were measured in all adult participants using the Cumulative Adversity Interview (CAI), a 140-item multifaceted assessment of life events and subjective stress. Additionally, perception of stress was measured using the Perceived Stress Scale (PSS), a widely used 10-item instrument. We created a composite stress score by summing the normalized scores of the PSS and the CS and ALE components of the CAI. Emotional regulation was measured in all participants using the Difficulties in Emotion Regulation Scale (DERS), with higher scores reflecting a greater degree of impairment in emotional regulation. We categorized participants as having high emotional regulation if their DERS score was less than the 50th percentile score. Our outcomes included blood pressure (BP), body mass index (BMI), and insulin resistance as measured by the Homeostasis Model Assessment (HOMA-IR). We created a composite outcome of cardiovascular risk (CV risk): 0 points for normal BP, BMI and HOMA-IR; 1 point each for BP 121-139/81-89, BMI 25-30, and HOMA-IR 2.6-3.8; and 2 points each for BP ≥ 140/90, BMI > 30, and HOMA-IR > 3.8. Covariates included age, sex, race, years of education, and smoking status. We used linear regression to evaluate unadjusted and adjusted associations between the chronic and perceived stress scales, as well as the composite stress score, and cardiovascular risk among participants with high and low emotional regulation, respectively.

RESULTS: Our sample was 57 % female, 71 % white, 25 % current smokers, and had a mean (SD) age of 31.5 (10.7) years, and obtained 15.1 (2.5) years of education. Our sample had mean (SD) systolic BP 123.1 (15.2), diastolic BP 75.8 (11.4), BMI 27.6 (5.7), and HOMA-IR 3.17 (2.06). In the full sample, CV risk was associated with chronic stress ($r=0.514$; $p<0.001$), cumulative adverse life events ($r=0.05$; $p<0.001$), perceived stress ($r=0.411$; $p=0.018$), and our composite stress score ($r=0.13$; $p<0.001$). All associations remained significant after adjusting for covariates, except the association with CALE. Among those with high emotional regulation, CV risk was associated with CS ($r=0.04$; $p=0.008$), CALE ($r=0.046$; $p<0.001$), and our composite stress score ($r=0.123$; $p=0.011$), but not with PSS alone ($r=0.008$; $p=0.597$). After adjustment for covariates, the association with the composite stress score was attenuated ($r=0.036$; $p=0.485$). Among participants with low emotional regulation, CV risk was associated with CS ($r=0.041$; $p=0.002$), CALE ($r=0.055$; $p<0.001$), PSS ($r=0.029$; $p=0.011$), and the composite stress score ($r=0.151$; $p<0.001$). The association between our composite stress score and CV risk remained significant after adjustment for all covariates ($r=0.096$; $p=0.041$).

CONCLUSIONS: Emotional regulation may mitigate the association between chronic stress and cardiovascular risk. Composite chronic and perceived stress and cumulative adverse life events was associated with cardiovascular risk only among participants with poor ability to regulate emotions. Emotional regulation is a teachable skill, and may play a role in prevention of cardiovascular disease. Furthermore, because racial/ethnic minorities and those with low socioeconomic status face greater chronic stress from ongoing

discrimination and financial insecurity, improving emotional regulation in these target populations may reduce disparities in cardiovascular risk.

THE PATIENT-CENTERED MEDICAL HOME AND ASSOCIATIONS WITH HEALTHCARE QUALITY, UTILIZATION AND COSTS: A FIVE-YEAR COHORT STUDY Lisa M. Kern; Alison M. Edwards; Rainu Kaushal. Weill Cornell Medical College, New York, NY. (Tracking ID #2196102)

BACKGROUND: Effects of the Patient-Centered Medical Home (PCMH) are unclear. Previous studies may have been limited by relatively short follow-up periods and may not have fully distinguished the effect of the PCMH (which involves electronic health records (EHRs) plus organizational changes) from EHRs alone. Our objective was to determine effects of the PCMH on quality, utilization and costs, compared to paper records and to EHRs alone, with extended follow-up.

METHODS: We conducted a prospective cohort study (2008–2012), including 3 years post-PCMH implementation. The study took place in the Hudson Valley, a 7-county, multi-payer, multi-provider region in New York State. We included a total of 438 primary care physicians in 226 practices, with 136,480 patients, across 5 health plans. The intervention group consisted of those primary care physicians who achieved Level III PCMH (as defined by the National Committee for Quality Assurance), all of whom used EHRs, and their attributed patients. We had two control groups: those primary care physicians who used paper medical records without PCMH transformation and those primary physicians who used EHRs without PCMH transformation. Outcomes were generated from administrative claims aggregated across the participating health plans, including 8 quality measures, 7 healthcare utilization measures, and total costs. We used generalized estimating equations to compare study groups for differences in the rate of change over time, adjusting for clustering and 13 potential confounders.

RESULTS: Of the primary care physicians, 125 (29 %) used EHRs and implemented the PCMH, 226 (52 %) used paper records without the PCMH, and 87 (20 %) used EHRs without the PCMH. The odds of quality improvement were 5 % greater in the PCMH group than in the paper group ($p<0.05$). The PCMH group used 7 % more primary care visits, 10 % fewer specialist visits, 4 % fewer laboratory tests, 4 % fewer radiology tests, 21 % fewer admissions and 57 % fewer readmissions, compared to the paper group over time ($p<0.05$), with no difference in emergency department visits. Total costs were lower in the PCMH group than in the paper group. Results were similar for comparisons between the PCMH and EHR group.

CONCLUSIONS: The PCMH model of primary care was associated with greater quality improvement, lower healthcare utilization and lower total costs, compared to either paper records or EHRs alone 3 years post-PCMH transformation. This study suggests that it is the combination of technology and practice culture that drives changes, rather than technology alone.

THE PROMISE OF SOCIAL MEDIA FOR HEALTH: A NATIONWIDE SURVEY OF PRIMARY CARE PATIENTS ON USAGE PATTERNS AND ATTITUDES James Colbert^{2, 6}; Neal Yuan⁴; Priyanka Agarwal³; Joy L. Lee¹; Katherine C. Chretien⁵; Lisa S. Lehmann⁶. ¹Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ²Newton-Wellesley Hospital, Newton, MA; ³University of California, San Francisco, San Francisco, CA; ⁴University of California, San Francisco, Walnut Creek, CA; ⁵Washington DC VAMC, Washington, DC; ⁶Brigham and Women's Hospital, Boston, MA. (Tracking ID #2199096)

BACKGROUND: Online social networks such as Facebook, Twitter, and Instagram have seen explosive growth in usage over the past few years. Data from the Pew Research Center reveal that approximately 73 % of online adults use at least one social networking site. However, little is known about whether this degree of online engagement holds true for patients at academic primary care clinics. Furthermore, scant data exist regarding the extent to which patients are sharing information about their own health on social media sites.

METHODS: We conducted a paper-based cross-sectional survey of patients at four academic primary care centers in Boston, Washington DC, and San Francisco. Clinics were chosen for geographic and demographic diversity. As part of the survey, patients were asked about ownership of electronic devices, usage of social media, and whether they posted about their own health on social media. The surveys were administered in English, and non-English speakers were excluded from participation. Logistic regression analysis was performed to evaluate the effect of age, race, ethnicity, education, and health status on use of internet and posting about health on social media.

RESULTS: The survey was completed by 491 respondents with a response rate of 86 %, recorded at 3 of the 4 sites. Overall, 92 % of respondents have a device capable of accessing the internet, including desktop computers (49 %), laptop computers (61 %), tablet devices (44 %) and smartphones (69 %). Eight percent did not own any device with internet access. With regards to social media usage, 68 % used at least one social media site within the last month. Of those using social media, 85 % use Facebook, 33 % Instagram, 28 % Twitter, 26 % Pinterest, and 18 % use blogs. Among patients who use social media, 34 % posted about their health on a social media site within the past 6 months: 80 % doing so on Facebook, 20 % on Instagram, 9 % on Twitter, and 7 % on blogs. Patients posted most frequently about their wellness (64 %), but other topics included mood (40 %), acute conditions (34 %), chronic conditions (31 %), and women's health (24 %). Most popular reasons for posting on social media were to connect with similar patients (36 %) or to share information with others (35 %). Fifty-four percent of patients listed privacy as "very important" when selecting a social media site to post about their health. When asked whether "social media can help me obtain useful health information," 27 % of all respondents agreed. However, among those who post about their health on social media, 46 % agreed with the statement. When compared with 18 to 34 year olds, patients aged 35–49, 50–64 and 65+ all had progressively lower rates of social media usage (OR=0.17, OR=0.04, OR=0.02, $p<0.05$). Those with a college degree were more likely to use social media when compared with those having a high school education or less (OR 2.7, $p=0.018$). When compared with the youngest patients, those aged 35–49, 50–64 and 65+ had lower odds of posting about health on social media (OR=0.37, OR=0.20, OR=0.23, $p<0.05$). Patients with a college degree were also less likely to post about their health when compared to patients with high school degrees or less (OR 0.42, $p<0.05$). Race, ethnicity and gender did not significantly affect social media usage or the odds of posting about health.

CONCLUSIONS: Rates of social media use among a geographically diverse cohort of primary care patients is high and mirrors use in previously published surveys of the general public. In addition, more than one-third of patients who use social media are posting about their own health, most frequently on topics concerning wellness and mood. Patient age and education level were the only demographic factors that significantly affected social media usage. While a majority of patients prioritize privacy concerns when choosing where to post online, they continue to share personal health information on Facebook, Instagram and other non-HIPAA secure public sites. These data support an opportunity for primary care and public health interventions to utilize social media sites such as Facebook to better engage with patients. Healthcare providers and systems will, however, need to find a way to balance patients' seemingly conflicting desire for privacy and sharing of personal health information online.

Usage of social media by primary care patients

	Number of respondents using social media platform	Percent of survey respondents using social media platform	Number of respondents posting about health on given social media site	Percent of respondents using given social media site who post about health on that site
Facebook	283	58 %	91	32 %
Instagram	111	23 %	23	21 %
Twitter	92	19 %	10	11 %
Pinterest	86	18 %	2	2 %
Blogs	60	12 %	8	13 %

Total survey respondents: $N=491$

THE RELATIONSHIP BETWEEN MULTIMORBIDITY AND CONCORDANT AND DISCORDANT CAUSES OF HOSPITAL READMISSION AT 30-DAYS AND ONE YEAR Arlene S. Bierman¹; Jun Guan²; Therese Stukel². ¹University of Toronto, Toronto, ON, Canada; ²Institute for the Clinical Evaluative Sciences, Toronto, ON, Canada. (Tracking ID #2200233)

BACKGROUND: Rates of hospital readmission increase with the number of comorbid conditions and comorbidities are often responsible for potentially avoidable readmissions. Thirty day readmission rates reflect hospital care and care transitions, while one year readmission rates reflect chronic disease management in the community. A better understanding of the contribution of comorbid conditions to readmissions among patients with multimorbidity is needed to reduce readmission rates.

METHODS: Using linked population-based administrative data from Ontario Canada from FY 2011 and 2012, a longitudinal cohort study of acute myocardial infarction (AMI), congestive heart failure (HF), chronic obstructive pulmonary disease (COPD) and hip fracture patients discharged after an index hospitalization determined disease-specific,

concordant (readmission diagnosis related to index condition), and discordant (readmission diagnosis unrelated to index condition) causes of hospital readmissions in each cohort at 30-days and 1 year. Multivariable regression models were used to assess the contribution of markers of patient complexity including multimorbidity to readmissions for discordant comorbidities.

RESULTS: Cohorts included 29,607 admissions for AMI; 22809 for COPD; 20,095 for HF; and 12857 for hip fracture. Age, sex, and readmission rates varied across cohorts. There was a high burden of readmissions at one year. For example, 18.5 % of HF patients were readmitted at 30 days and 57.5 % at one year. Across all cohorts the proportion of readmissions attributable to discordant comorbidities was greater at one year than 30 days ranging from 44 % for AMI to 91 % for hip fracture. Geriatric conditions (i.e., dementia, decubiti) contributed to readmission rates. Patient complexity was associated increased rates of readmission at 30-days and one year as well as with an increased proportion of readmissions attributable to discordant comorbidities.

CONCLUSIONS: After hospital admission for common conditions (AMI, HF, COPD, and hip fracture), discordant comorbidities are responsible for a sizable proportion of hospital readmissions and the burden of discordant admissions increases over the course of a year. Attention to readmission rates beyond 30-days and patient-centered models of care to effectively manage multimorbidity will be needed to reduce rates of potentially avoidable hospitalizations among older patients with multimorbidity and complexity who comprise the majority of patients admitted for these conditions.

THE ROLE OF ORGANIZATIONAL FACTORS IN THE PROVISION OF COMPREHENSIVE WOMEN'S HEALTHCARE IN THE VETERANS HEALTH ADMINISTRATION Shivani Reddy^{1, 3}; Danielle Rose²; James Burgess⁴; Martin Charns⁴; Elizabeth M. Yano². ¹Boston University, Boston, MA; ²VA Greater Los Angeles HSR&D Center, Sepulveda, CA; ³VA Boston Healthcare, Boston, MA; ⁴Boston University School of Public Health, Boston, MA. (Tracking ID #2197702)

BACKGROUND: The increasing number of women veterans (WVs) using the Veterans Health Administration (VHA) presents an organizational challenge to a healthcare system that, historically, has served primarily men. Female users of the VHA tend to be younger, use more services, have complex health issues, and require reproductive services traditionally not provided by the VHA. We examined the association of organizational factors and adoption of comprehensive women's healthcare models in the VHA.

METHODS: We conducted a cross-sectional secondary analysis of the 2007 VHA Survey of Women's Veterans Health Programs and Practices, administered to senior women's health clinicians at all VA facilities serving ≥ 300 WV in 2006. We achieved a response rate of 86 % ($n=193$ facilities) representing all Veterans Integrated Service Networks, and both hospital-based and community based clinics). Our primary dependent measure was type of local adoption of model of women's health care; specifically, a separate women's health clinic (WHC), a designated women's health provider integrated within primary care (DWHP), both (WHC/DWHP), or neither. Our secondary dependent measure was availability of a bundle of basic women's health (WH) services considered within the scope of primary care: cervical cancer screening and evaluation and management of vaginitis, menstrual disorders, contraception and menopause. Exposure variables included organizational factors drawn from an adaptation of the Greenhalgh model of diffusion and implementation of innovations and include: facility type and size, centralization, and slack resources; measures of absorptive capacity for change including academic affiliation and WH representation on VHA committees; and system readiness for innovation including quality assurance activities and champions for gender specific care.

RESULTS: Thirty-nine percent of sites had adopted a WHC, 12 % had DWHPs, 29 % had both models, and 20 % had neither. There was a greater likelihood of WHC and WHC/DWHP models at: hospital-based clinics; sites with a gynecology clinic, academically affiliated facilities, and facilities with larger numbers of WVs, compared to sites with DWHP or neither ($p<0.05$ for all). Sites with WH representation on higher-impact VHA committees (medical executive committee, space/building committee, pharmacy committee) were more likely to have WHC or WHC/DWHP (46 and 32 %, respectively) as compared to DWHP (12 %) or neither (22 %) ($p=0.05$). All five basic WH services were more likely to be offered at sites with WHC (89 %) or both WHC/DWHP (89 %) as compared to sites with DWHP (71 %) or neither (66 %) ($p=0.003$).

CONCLUSIONS: Organizational factors associated with adoption of WHC and WHC/DWHP models of care include larger sites (hospital-based sites and larger volume of WV patients) and greater absorptive capacity (e.g., academic affiliation and WH representation on high-impact committees). Moreover, facilities that adopt a model of WH care that includes a separate WHC are more likely to deliver a bundle of basic WH services, realizing the goal of "one stop shopping" for WVs. Developing relationships between VA WH within the VA through committee leadership and outside of the VA with academic institutions may promote comprehensive models of WH care.

THE ROLE OF THE HOSPITAL PHYSICIAN IN LONG TERM OPIOID USE

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BACKGROUND: The use of chronic opioid therapy (COT) to treat chronic, non-cancer pain has increased in spite of limited evidence for its efficacy. Patients on COT have increased risk of opioid use disorders. Most opioid prescribing has traditionally involved primary care physicians, orthopedists, and emergency physicians. Hospital physicians increasingly care for many hospitalized patients yet little is known about opioid prescribing at hospital discharge. We aimed to characterize the frequency of opioid initiation at hospital discharge and to quantify the risk of long-term opioid use in patients initiated on opioids at hospital discharge.

METHODS: This was a retrospective cohort study of all patients presenting to a single safety-net medical center in 2011. We electronically queried data from the medical record. The first hospital discharge per patient during 2011 was the 'index discharge'. Patients who received opioids within 12 months preceding their index discharge were excluded. Remaining patients were described as *opioid naïve* and were categorized into two groups, 'opioid receipt' if the patient filled an opioid within 72 h of hospital discharge or 'no opioid receipt' if the patient did not fill an opioid within 72 h of hospital discharge. We defined long-term opioid use as 'receipt of a 120+ day supply of opioids or 10+ opioid prescriptions dispensed 365 days following hospital discharge. Logistic regression modeled the risk of long-term opioid use while adjusting for chronic pain, malignancy, chronic disease, and hospital readmissions. Cumulative logistic regression modeling described the risk of greater opioid use while adjusting for gender, insurance, mental health disorder, chronic disease, chronic pain, surgery, and hospital readmissions.

RESULTS: In 2011, 16,053 index discharges were identified. Of these, 6689 discharges (42 %) were among opioid naïve patients. Twenty-five percent of opioid naïve patients ($n=1699$) were prescribed a new opioid within 72 h of their index discharge. Hydrocodone/acetaminophen ($n=910$, 50 %) was the most frequently prescribed opioid followed by oxycodone/acetaminophen ($n=342$, 19 %). Patients with 'opioid receipt' at discharge were more likely to have a 3-year history of neoplasm (6.3 % versus 3.5 %, $p<0.001$), a discharge diagnosis of acute pain (2.7 % versus 1.0 %, $p<0.001$), or underwent surgery during their index visit (65.1 % versus 18.4 %, $p<0.001$) compared to patients with 'no opioid receipt' at discharge. Patients with 'no opioid receipt' at discharge were more likely to have a 3-year history of alcohol use disorder (20.7 % versus 15.7 %, $p<0.001$) and a 3-year history of any mental health disorder (31.4 % versus 23.9 %, $p<0.001$) compared to patients with 'opioid receipt' at discharge. Opioid naïve patients with 'opioid receipt' at discharge were more likely to meet criteria for long-term opioid use 365 days following their index discharge compared to patients with 'no opioid receipt' at discharge (4.1 % versus 1.3 %, $p<0.0001$). The adjusted odds of long-term opioid use in patients with 'opioid receipt' at discharge was 5.80 (95 % CI 3.87–8.68; $p<0.001$). The adjusted odds of greater number of subsequent refills among patients with 'opioid receipt' at discharge was 2.84 (95 % CI 2.43–3.31; $p<0.0001$) over a 365 day period.

CONCLUSIONS: Among opioid naïve patients discharged from a safety-net medical center, 25 % filled an opioid prescription within 72 h of hospital discharge. Receipt of a new opioid at discharge increased long-term opioid use by nearly 6-fold. Limitations included the absence of information regarding opioid fills at non-affiliated pharmacies, which likely resulted in ascertainment bias. Hospital physicians should consider the risk of long-term opioid use when initiating opioids at hospital discharge. Involving the primary care physician before opioid initiation and ensuring reliable patient-provider follow-up may reduce long-term opioid use.

THE USE OF FICTIONAL MEDICAL TELEVISION IN MEDICAL EDUCATION: A SYSTEMATIC REVIEW

Brian A. Primack; Beth Hoffman; Ariel Shensa; Charles B. Wessel. University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2198764)

BACKGROUND: Over the past 20 years, since the 1994 premiere of *ER* and *Chicago Hope*, the number of fictional medical television shows has increased substantially. The popularity of medical television shows among medical and other health professional students is well documented. For example, one study reported that more than 90 % of medical and nursing students watch these programs. Furthermore, fictional medical television may influence health professional students. For example, more than 50 % of students report that they discuss ethical issues from fictional medical television with friends, and the number of students pursuing an emergency medicine specialty doubled immediately after the premiere of *ER*. Some medical educators have taken advantage of the popularity of these programs by utilizing them as a mechanism to explore critical

issues in medical education, such as bioethics and professionalism. However, there has yet to be a systematic review of this literature to synthesize existing research and make recommendations for future study. This review aims to fill that gap.

METHODS: Systematic literature searches were conducted in three databases: Medline, Ovid CINAHL and Ovid PsychINFO. Search strategies were developed by a professional research librarian with specialized experience in systematic literature reviews. Reference lists of retrieved articles were searched to identify additional relevant articles. Selected studies were required (1) to be published in a peer-reviewed journal, (2) to be related to a fictionalized medical television program taking place primarily in a health-related setting, and (3) to assess health professional students' knowledge, perceptions and/or behaviors based on exposure to the program. In light of critical consensus supporting the 1994 premiere of *ER* and *Chicago Hope* as marking a distinct new era of fictional medical television, we also restricted selected studies to those published in the past 20 years. Studies were classified according to (1) participant factors such as student type and target student level, (2) exposure-related factors such as the specific program and its dose of exposure, (3) outcome-related factors such as whether knowledge, perceptions, and/or behavior were assessed, and (4) study quality.

RESULTS: Of 1422 unique studies identified, only eight met all selection criteria. Four studies (50 %) involved undergraduate medical students, one study (13 %) involved nursing students, one study (13 %) involved both medical and nursing students, and the remaining two studies (25 %) involved other graduate health professional students. The most commonly utilized programs were *ER* (50 %), *Grey's Anatomy* (38 %), and *House M.D.* (38 %). Four studies (50 %) examined the association of program exposure with student perceptions of health care, three studies (38 %) examined associations between program exposure and student behavior, and four studies (50 %) examined the effectiveness of using clips as educational tools. Of studies assessing the impact on student perceptions of health care, 100 % found that students identify with fictional characters and plot lines. The most common behaviors studied were viewing habits (100 %) and being asked about plot lines with friends or family (38 %). The majority (75 %) of studies utilizing clips in a classroom setting focused on issues of communication and professionalism. All studies reported that students found the seminars helpful and engaging. However, no studies described educational experiences extending beyond a single university, and no studies assessed the impact of the educational experience on intentions and/or behaviors related to clinical practice. Most studies were of fair to poor quality in terms of rigor of study design.

CONCLUSIONS: Students of the health professions commonly view fictional medical television dramas. There seems to be substantial promise in terms of leveraging these characteristics of fictional medical television programs to enhance current classroom instruction and facilitate discussions related to factors such as patient-provider communication, biomedical ethics, and professionalism. This is especially the case because viewers are generally able to recall storylines from fictional narratives and to identify with fictional characters. Some studies have explored the potential use of these programs to improve medical education, and these studies suggest that these types of educational experiences are highly acceptable to students, feasible to implement, and potentially valuable in terms of efficacy. However, only a few studies have been conducted in this area, and these studies have been limited in terms of scope and study quality. It would be particularly valuable for future work to utilize more rigorous study designs and to more directly assess the impact of these experiences on clinical practice instead of focusing on feasibility and acceptability.

THE USE OF TELE-MENTAL HEALTH TO ADDRESS WOMEN VETERANS' MENTAL HEALTH NEEDS IN VA

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BACKGROUND: Tele-mental health promises much for providing access to mental health care for patients in rural areas, and reducing geographic limitations on meeting the needs of patients in areas that lack experienced providers for specific conditions. Tele-mental health applications such as one-on-one and group video conferencing have been shown to have a high degree of acceptability with patients and providers. Women are a growing minority in VA with significant mental health needs that may differ from their male counterparts. Little is known about the availability and potential for tele-mental health to better address the mental health needs of women Veterans.

METHODS: We conducted semi-structured interviews with key stakeholders at four VA hospitals and associated community outpatient clinics in four metropolitan centers and their surrounding areas. Interviewees were recruited by email and included clinic directors, primary care and mental health leaders, women's health and mental health providers,

women's services directors, tele-health coordinators, and other VA staff members directly involved in the care of women patients. We asked about the main needs, including mental health needs, of women patients and the availability of tele-mental health services to meet these needs. Interviews were recorded, professionally transcribed, and summarized within a template of key domains. Transcripts were coded in ATLAS.ti (version 7) for content related to women's mental health needs and mental health applications for tele-health services. Thematic analysis was facilitated by the grouping of relevant coded sections of text.

RESULTS: Interviews were completed with 43 participants between July and September of 2012. Interviewees generally viewed mental health needs as highly prevalent among women Veterans, including Military Sexual Trauma (MST), Post-Traumatic Stress Disorder (PTSD), depression, anxiety, and eating disorders, as well as trauma in general. Across all four geographic areas, tele-mental health was the most established form of tele-health services, utilized to connect patients at outpatient clinics with distant mental health providers for one-on-one therapy via video conferencing; tele-mental health group therapy was less widely used. Interviewees frequently mentioned the advantage of tele-mental health to reduce the burden of travel on rural patients, and connect patients with providers who have specialized experience with particular mental health needs, such as MST. Due to the significant mental health needs of women Veterans, most interviewees expressed the desire to expand tele-mental health in order to better serve more women. Some hoped to expand tele-mental health to include gender-specific group therapy, offering women's-only groups in geographic areas having insufficient numbers of women Veterans for in-person groups. A minority of interviewees voiced concerns about using tele-mental health in women with significant trauma histories who may be prone to suicidal tendencies.

CONCLUSIONS: Tele-mental health is well established at the VA sites studied and, among key provider and leadership stakeholders, had a high degree of acceptability for addressing the mental health needs of women Veterans. Stakeholders also expressed enthusiasm at tele-mental health's potential to improve access to care. Both within and outside VA, there is opportunity for further growth to make tele-mental health services available to more women, especially those in rural areas. Tele-mental health group therapy may be one area for expansion. Future work in this area should incorporate the perspectives of women Veterans, as they were not included in this study. More research is also necessary to determine if some sub-groups of women patients, such as those with significant trauma, are more or less appropriate to be served by tele-mental health.

TIMING OF READMISSIONS FROM POST-ACUTE CARE: IMPLICATIONS FOR IMPROVING THE QUALITY OF TRANSITIONAL CARE

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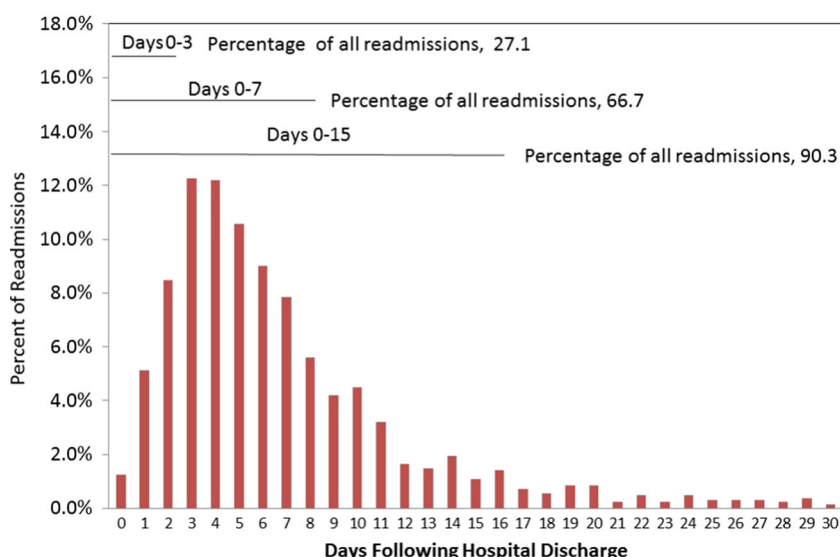
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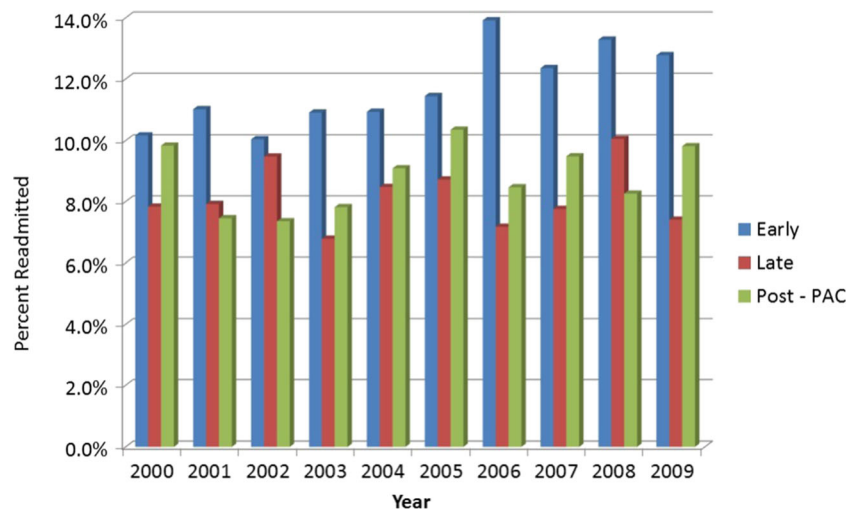
BACKGROUND: The number of older adults discharged to post-acute care (PAC) facilities after hospitalization has increased by 50 % nationally between 1996 and 2010. However, outcomes of this care are far from optimal: readmission rates from these facilities exceed those of discharges home and are increasing rapidly as patients are discharged from the hospital "quicker and sicker." These readmissions are important because they are linked to progressive disability and early mortality in older adults. Best practices for reducing these readmissions are not known. Describing the timing of readmissions during the PAC stay may lend insight into the role hospital and transitional care processes (which more likely lead to early readmissions) and PAC facility care processes (which may be more associated with readmissions after this initial period) play in readmissions, guiding future interventions. We sought to describe the timing of readmissions from PAC facilities using the Medicare Current Beneficiary Survey (MCBS) from 2000–2009.

METHODS: The MCBS is a nationally representative cohort of approximately 16,000 Medicare beneficiaries surveyed at regular intervals over a 4-year period with matching Medicare claims data. We identified Medicare beneficiaries who had an acute hospitalization, were discharged to a PAC facility (defined as a skilled nursing or rehabilitation facility), and were readmitted to an acute care hospital during that stay. We recorded the post-hospital day their readmission occurred. We also examined trends from 2000 to 2009 in early (within 7 days), late (day 8 to day of PAC discharge), and post-PAC (within 30 days of PAC discharge) readmissions.

RESULTS: Overall, 1288 of 6502 patients discharged to PAC were readmitted during their PAC stay (19.8 %). Of all readmissions, 66.7 % occurred in the first 7 days after hospital discharge and more than 90 % within the first fifteen days (Figure 1). Each year, early readmissions were more common than late or post-PAC readmissions (Figure 2), though early readmissions increased throughout the time period without substantial increases in readmissions during either of the other two periods. The 7-day readmission rate increased from 10.6 % (2000–2004) to 12.8 % (2005–9) on average.

CONCLUSIONS: More than 2/3 of all readmissions from PAC facilities occur in the first 7 days after hospital discharge and early readmissions are becoming more common over time. This is a strikingly different distribution than for discharges home, for example, in which only one-third of readmissions occur during the first 7 days after hospital discharge. Our results suggest targeting hospital and transitional care processes may be most fruitful for reducing these readmissions. Our future work will seek to identify the cause of readmissions during early and late periods, identify modifiable risk factors for readmission in patients being discharged to PAC, and evaluate how these factors are changing over time.





TOBACCO USE AMONG FORMER INMATES: RELAPSE AND PREDICTORS OF A DESIRE TO QUIT Michael Frank²; Sung-joon Min²; Rachel Blumhagen⁴; David Weitzenkamp⁴; Shane Mueller^{3, 2}; Brenda Beaty⁵; Ingrid A. Binswanger¹. ¹University of Colorado School of Medicine, Denver, CO; ²University of Colorado School of Medicine, Aurora, CO; ³University of Colorado at Anschutz Medical Campus, Aurora, CO; ⁴Colorado School of Public Health, Aurora, CO; ⁵University of Colorado, Aurora, CO. (Tracking ID #2173116)

BACKGROUND: Inmates and former inmates have a high prevalence of tobacco use. Evidence suggests that the majority of inmates and former inmates, reflective of the general population, will die of tobacco-related illnesses rather than illicit substance abuse, alcohol use, or traumatic injuries. Despite widespread tobacco-free prison policies making it more difficult to smoke in prison, almost all inmates relapse on tobacco within days of release from prison. Social stressors and risky health behaviors are associated with tobacco use in the general population. However, the relationship between social stressors, risky health behaviors, and tobacco use in former inmates has not been studied. The aim of this study is to explore the relationship between the desire to quit smoking and seven distinct social stressors and risky health behaviors in a sample of former inmates.

METHODS: Former inmates were interviewed 7 to 21 days after release from prison. Social stressors and risky health behaviors were characterized by unemployment, unstable housing, problems with family, friends, and/or significant others, low educational achievement, hazardous drinking, recent drug use, and major symptoms of depression. Associations between social stressors and risky health behaviors and the desire to quit smoking were analyzed using Pearson chi-square test of association. The final multivariable logistic regression model was selected based on a comparison of AIC values.

RESULTS: Of those who had to quit smoking due to tobacco-free prison policies, 98 % reported that they relapsed on tobacco after being released, 74 % of them within 1 day and 26 % in 2 or more days. The desire to quit smoking was associated with the absence of hazardous drinking in the past 30 days (Adjusted OR 6.4, 95 % CI 2.0–20.5) and the absence of any drug use in the past 30 days (Adjusted OR 3.3, 95 % CI 1.1–10.6).

CONCLUSIONS: Tobacco-free policies in correctional facilities are not an effective strategy to promote long-term smoking cessation among former inmates. Targeting tobacco cessation interventions at former inmates who do not engage in hazardous drinking or illicit drug use may be more effective. Further research may determine whether interventions addressing risky health behaviors, namely hazardous alcohol use and drug use, can reduce smoking relapse among former inmates.

TOO OLD TO GET TESTED?: HIV TEST ACCEPTANCE AMONG PATIENTS 50 YEARS AND OLDER IN A ROUTINE HIV TESTING PROGRAM AT A PRIMARY CARE CENTER IN A HIGH HIV PREVALENCE AREA Enoch Kotei¹; Heather Freiman²; Natasha Travis². ¹Emory, Atlanta, GA; ²Emory University, Atlanta, GA. (Tracking ID #2198562)

BACKGROUND: UNAIDS and the WHO estimate that 2.8 million of the 40 million people worldwide infected with HIV are age 50 and older. In the United States, over 15 % of the 40,000 new cases diagnosed yearly are in persons age 50 years and older, and 2 % of these cases are in patients age 65 years and older (CDC 2006). Due to the increased life span for HIV-infected persons, it is estimated that this year, half of all adults living with HIV in the United States will be over the age of 50. Older adults are less frequently tested for HIV often when providers selectively initiate testing (Moore & Amburgey, 2000); thus, older adults, in particular, may benefit from routine testing as recommended by the CDC. Therefore, the acceptance rate of testing in the older adult population compared to younger patients merits further investigation.

METHODS: In this analysis, data from a routine HIV screening program in a primary care center (PCC) were compared for patients age 50 and older vs. patients age 18–49 years at time of visit. During triage, staff members were asked to complete an HIV test eligibility assessment for every patient. Patients who were not known to be HIV positive, over 18 years old, not incarcerated, clinically capable of consent, and not tested in the past 6 months were eligible for the HIV test offer. HIV testing was conducted via 3rd generation EIA testing with reflex Western Blots for EIA positive samples. Data were extracted from Electronic Medical Record reports for all PCC patients triaged during the 12 month period from October 1, 2013 to September 30, 2014. Frequencies of the following variables were compared for older vs. younger patients: HIV test eligibility assessment initiation, HIV test offer, HIV test acceptance, and HIV test completion. Data analyses were conducted using SAS 9.3 statistical software, and the Z-test for proportions was used to assess differences between comparator groups.

RESULTS: From October 1, 2013 to September 30, 2014, 42,420 patients were triaged in the PCC. Of these patients, 30,652 were at least 50 years old (72.2 % of patients triaged), with a mean age of 55.4 ± 12.9 years (patient age range of 18–106 years). Older patients less frequently had the HIV test eligibility assessment initiated at triage (69.4 % of patients 50 and older vs. 72.8 % of younger patients, $p=0$). Among patients with the eligibility assessment completed, older patients were more frequently offered an HIV test (69.6 vs. 63.7 % of younger patients, $p=0$). However, older patients declined the HIV test offer more frequently than younger patients (37.1 vs. 52.6 %, $p=0$). Additionally, older patients were less likely to complete an HIV test within one year of accepting the test, compared to younger patients (39.1 vs. 42.1 %, $p=0.01$). Frequencies of demographic characteristic (race and sex) were similar for comparator groups (50 years and older vs. 18–49 years old) in all analyses described here.

CONCLUSIONS: In this primary care population, older adults were less likely to accept and complete HIV testing when compared to younger adults, with multiple factors possibly contributing. First, as previously mentioned, the perceived risk by provider and patient could be relatively low, since the general public commonly associates HIV infection with younger individuals engaging in risky behaviors. In addition, concerns about HIV infection could be overshadowed by concerns about chronic disease management and addressing more common causes of death in this population, such as heart disease and cancer. These factors may cause a provider to be less insistent on testing and lead to patient refusal or procrastination. Missed opportunities for testing in older adults are consequential, as undiagnosed patients further contribute to high infection rates and fail to benefit from therapies which could extend their life expectancy. The data in this study highlights the need for providers to educate older adults on their risk of HIV acquisition and the importance of testing, using pre-existing statistics as rationale for screening.

TRAINING HOSPITALISTS TO USE MICROSKILLS AND SMALL GROUP TEACHING STRATEGIES CAN IMPROVE CONFIDENCE AND PERFORMANCE IN WARD ROUND TEACHING Verity Schay¹; Frank Volpicelli¹;

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BACKGROUND: Inpatient ward rounds are an essential component of clinical training for residents and medical students. However, attendings are often challenged to engage and teach learners at various training levels. The effective use of the five-step microskills and small group teaching skills has been well studied in the outpatient setting but not the inpatient setting. We sought to improve teaching to all levels of learners by training hospitalists in the use of these educational methods.

METHODS: Internal medicine hospitalists were recruited from 3 institutions to participate in a three-hour workshop focused on the use of microskills and small group teaching skills during ward rounds. The workshop paired clinical content (case based discussion of pain management) with these teaching skills. Participants were divided into small groups (3–4) that first reviewed the five-step microskills and small group teaching skills, and then engaged in role play exercises with feedback from medical education experts and peers. Participants teaching skills were assessed 7 months apart using a pre and post-intervention Observed Standardized Teaching Exercise (OSTE) where participants were tasked with leading ward rounds for a team that consisted of 3, standardized learners—intern, resident and student. Each of these learners independently completed a checklist that rated the participants teaching skills as not done, partially done, or well done. Teaching skills were assessed in three domains: general teaching skills, use of microskills, and use of small group teaching skills. At the conclusion of the workshop, participants completed retrospective pre/post assessments that assessed change in teaching confidence and likelihood of using microskills or small group teaching skills.

RESULTS: Eighteen hospitalists participated in the workshop. At the baseline OSTE, general teaching skills were rated highest by the standardized intern (45 % well done) compared to the resident (39 %) and the student (27 %) (difference between the intern and student, $P=0.003$). At the post-intervention OSTE, the resident and student ratings of general teaching skills increased (resident 62 % well done, $P=0.03$, and student 53 % well done, $P=0.005$). There was no longer a difference between the intern and student ratings ($P=0.29$). Rating of participant small group teaching skills improved for the resident (40 to 67 % well done, $P=0.04$) and student (39 to 62 % well done, $P=0.05$) but decreased for the intern (55 to 33 % well done, $P=0.07$). Use of microskills ratings were high at baseline OSTE assessment and did not significantly change post-intervention. In retrospective pre/post assessments, program participants reported increased confidence in their ability to teach on the ward from baseline to post-intervention (7 to 40 % very confident, $p=0.02$) and teach learners at different levels during ward rounds (0 to 42 % very confident, $p=0.02$). Participants reported they were more likely to develop a teaching strategy before beginning ward rounds (0 to 58 % very likely).

CONCLUSIONS: A three-hour workshop with peer and medical education faculty feedback was able to improve hospitalists' ability to teach a range of learners rather than focus on one. Hospitalists' confidence in their ability to conduct ward rounds, teach a range of learners and to develop a teaching strategy prior to rounds increased. Hospitalists trained to use small group

teaching skills and microskills may be able to positively change the dynamic of the inpatient learning environment.

TRAINING THE NEXT GENERATION OF PHYSICIANS: HOW EFFECTIVE ARE RESIDENTS AT DIAGNOSING AND TREATING DEPRESSION? Sondra

Zabar²; Kathleen Hanley²; Lisa Althuler²; Amara Shaker-Brown²; Irina Nudelman²; Ellen Wagner²; Barbara Porter²; Andrew B. Wallach¹; Adina Kalet²; Mrudula Naidu²; Colleen Gillespie². ¹Bellevue Hospital, New York, NY; ²NYU School of Medicine, New York, NY. (Tracking ID #2198869)

BACKGROUND: The high prevalence of depression in primary care clinics, depressed patients' low quality of life, and extensive use of health care services underscores the need for all internal medicine residents to be skilled at diagnosing, treating, and managing depression. We designed an unannounced standard patient (USP) case to assess residents' clinical skills and help tailor future curriculum on depression.

METHODS: The USP was a 22-year-old male presenting as a new patient to an urban public clinic complaining of fatigue. He reported problems sleeping and stress at work. Goals of the case were for the resident to diagnose a common presentation of depression and engage the patient in a treatment and follow-up plan. The USP was trained to have a positive PHQ 2, meet depression criteria on a PHQ 9 if symptoms elicited, have family history of depression, and be willing to engage in treatment (medication and/or therapy) if offered and explained. The USPs trained for six hours in character portrayal and checklist completion. Tablets were used post-visit to collect data. A checklist was created to assess general communication and case specific skills. Domains included: depression and substance use screen, current life situation assessment, and follow-up. Item response options were: not done, partly done, and well done, each with descriptive behavioral anchors to enhance rating reliability. Domain scores were calculated as percent items rated well done. Case fidelity was checked by audiotape review of encounters to ensure presentation matched core case details and appropriate emotional tone. One hundred two medicine residents saw the USP case from 2009 to 2014.

RESULTS: Mean USP visit length=44 min, SD=18 min (range:15 to 155 min). Overall communication skills in the fatigue case were not significantly different than those of the other USP cases. Specifically, a little over 50 % acknowledged emotions appropriately and 60 % used effected non-verbal behaviors to enrich communication. Though 62 % provided clear explanation and information in manageable chunks, only 50 % checked back to confirm patient understanding. Sixty-nine percent screened for depression with PHQ2, and 68 % further explored criteria for depression. Only 42 % asked about family history for depression and 34 % about social or family support. Over 70 % completely assessed smoking, drug use, and past medical problems. Only 48 % drew a connection between depression and the presenting symptoms, 44 % discussed medication and therapy as treatment options, and 29 % did not discuss either. A third assessed the patient understanding of depression while a third did not ask at all. Over 68 % reviewed the final plan with the patient. Though most of the patients were satisfied with the time spent (76 %), only 50 % reported they got enough information and had all their concerns addressed. Only 25 % of the USPs reported that they were activated to deal with their depression after the visit. Residents' patient activation skills were lower in this case compared to other USP visits (25 % vs 32 %, $p<.003$).

CONCLUSIONS: Most residents are able to diagnosis depression in a new patient, but there is large variation in patient education and counseling skills. More attention needs to be paid to these skills in order to improve patient activation, which leads to improved patient outcomes.

TRAIT, STATE, AND PLACE: THE ROLE OF PERSONALITY AND ENVIRONMENT IN DRUG USE Karan A. Phillips¹; Dexter Louie²; Melody Fumari¹; William

Kowalczyk¹; David H. Epstein¹; Kenzie L. Preston¹. ¹National Institute on Drug Abuse, National Institutes of Health, Baltimore, MD; ²University of California, San Francisco School of Medicine, San Francisco, CA. (Tracking ID #2199122)

BACKGROUND: Addiction is complex with many attributed causative factors. Personality traits have long been linked to vulnerability to SUD as have state variables such as family history. Environmental factors such as neighborhood of residence have also been found to contribute to vulnerability to addiction. We sought to compare the personality traits and neighborhood of residence of drug users and non-drug users to better understand the relative contributions of trait/personality vs. place/environment to vulnerability to addiction.

METHODS: Participants were administered the NEO Five Factor Inventory to assess 5 personality or trait factors—neuroticism, extraversion, openness, agreeableness, and

conscientiousness, and the Addiction Severity Index to assess state variables such as personal and family drug use history. Place of residence was assessed with the Neighborhood Inventory for Environmental Typology (NIEtY), a standardized inventory assessing the incidence and prevalence of environmental indicators of physical, social, and drug-related disorder (1 lowest to 8 highest disorder). Analysis was done with Stata 10 and included *t* tests, Pearson χ^2 , Fisher's exact and multivariate logistic regression.

RESULTS: Participants included 104 current opioid/stimulant users (CDUs) and 88 non drug users (NDUs). The average age (SD) was greater in the CDUs (46(9) vs. 35(11) years, $p<0.001$) and more CDUs were male (76 % vs. 39 %, $p<0.001$). There was no difference in race ($p=0.109$). Neuroticism percentiles were higher in the CDUs ($p<0.001$); and extraversion, openness, agreeableness, and conscientiousness percentiles were lower (all $p<0.001$). NIEtY scores were higher for CDUs (mean (SD) 5.1(1.5) vs. 3.9(1.8), $p<0.001$). In the multivariate model predicting drug use status, age (OR 1.10, CI(1.05,1.17), $p<0.001$), female gender (OR 0.22, CI(0.07,0.66), $p=0.007$), years of cannabis use (OR 1.26, CI(1.12,1.42), $p<0.001$), nuclear family history of addiction (OR 4.34, CI(1.49,12.6), $p=0.007$), openness (OR 0.97, CI(0.95, 0.99), $p=0.007$), agreeableness (OR 0.98, CI(0.96, 1.00), $p=0.03$), and NIEtY scores (OR 1.53, CI(1.08, 2.16), $p=0.017$) were significant.

CONCLUSIONS: While trait, state, and place variables all determined drug use status, a nuclear family history of addiction (state variable) and neighborhood physical, social, and drug-related disorder (place variable) were stronger predictors of drug use status than personality (trait variable).

TRANSFORMING TEAM DYNAMICS IN PRIMARY CARE PRACTICES: CHANGES BETWEEN YEAR 1 AND YEAR 2 OF THE ACADEMIC INNOVATIONS COLLABORATIVE Hummy Song³, Alyna T. Chien^{4, 1}, Antoinette S. Peters¹, Meredith Rosenthal², Sara Singer². ¹Harvard Medical School, Boston, MA; ²Harvard School of Public Health, Boston, MA; ³Harvard University, Boston, MA; ⁴Boston Children's Hospital, Boston, MA. (Tracking ID #2196136)

BACKGROUND: Team-based medical practice has been promoted as critical for improving health care quality and patient outcomes. Better team dynamics among primary care providers (PCPs) may also improve clinical work satisfaction and enhance patient care coordination between PCPs. The Academic Innovations Collaborative (AIC) was a 2-year learning collaborative of 19 hospital- and community-based, academically-affiliated primary care practices committed to building highly functional teams, managing populations, and engaging patients. In AIC Year 1 (FY 2012/13), participating practices reorganized all personnel into teams; in AIC Year 2 (FY 2013/14), practices finished empaneling their patients to physicians and their respective teams. In this paper, we assess the changes in primary care team dynamics, clinical work satisfaction, and patient care coordination between PCPs between AIC Years 1 and 2.

METHODS: We employed a pre-post design using survey data collected in AIC Years 1 and 2. We used a previously validated 29-item Primary Care Team Dynamics survey instrument to assess levels of team dynamics across 7 domains, 1 item to measure clinical work satisfaction, and 8 items to measure perceived quality of patient care coordination between PCPs. All responses were assessed using a 5-point Likert response scale, from 1 = strongly disagree to 5 = strongly agree. In the fall and winter months of each year, we administered this survey to all attending and trainee PCPs (primary care physicians, nurse practitioners, physician assistants, residents), and non-PCPs directly involved in patient care (nurses, allied health professionals, administrative staff). We examined the change in primary care team dynamics and clinical work satisfaction, respectively, using individual-level, linear regression models adjusting for age, gender, race/ethnicity, and professional discipline. To examine the change in patient care coordination between PCPs, we used the same model specification but limited our population to attending and trainee PCPs, because patient care coordination between PCPs is not applicable to non-PCPs. For all models, we used practice-level fixed effects to account for unobservable differences across practices and estimated heteroskedasticity-robust standard errors clustered by primary care practice. To control for practices' Year 1 levels of team dynamics, clinical work satisfaction, and patient care coordination between PCPs in examining changes between intervention Years 1 and 2, we repeated these analyses while holding constant the Year 1 quartile of the practice's average responses.

RESULTS: We received 1034 responses (66 %) for the Year 1 survey and 1001 responses (64 %) for the Year 2 survey. Year 1 levels of team dynamics, clinical work satisfaction, and patient care coordination between PCPs were 3.4, 3.7, and 3.9 respectively out of 5. By Year 2, ratings for each measure had increased. The overall team dynamics score increased by 7 % (.38 of 1 SD), clinical work satisfaction increased by 3 % (.09 of 1 SD), and PCP ratings of patient care coordination between PCPs increased by 5 % (.38 of 1 SD). After adjusting for respondent characteristics and practice-level fixed effects and

clustering standard errors, we found statistically significant improvements for the overall team dynamics score, each of the 7 domains of team dynamics, and patient care coordination between PCPs ($p<0.01$ for each). However, we found no statistically significant difference in clinical work satisfaction between intervention Years 1 and 2 ($p=0.08$). When also adjusting for the Year 1 quartile of the practice's average responses, we obtained results of similar magnitude and significance, which indicates that results improved without regard to practice's performance level in Year 1.

CONCLUSIONS: The first year of AIC activity has yielded statistically significant improvements in primary care team dynamics and patient care coordination between PCPs. However, we do not find statistically significant improvements in clinical work satisfaction. Across all of these dimensions, the changes between intervention Years 1 and 2 represent moderate increases, and opportunities remain to improve team dynamics, coordination, and satisfaction. Nevertheless, the identification of some progress after just the first year of collaborative effort suggests that focusing a primary care transformation initiative on building highly functional teams has potential to yield a range of positive repercussions for academically-affiliated primary care practices.

TRANSLATING CHANGES IN CHOLESTEROL TREATMENT GUIDELINES INTO CLINICAL PRACTICE- A HEAVY LIFT FOR SAFETY-NET INSTITUTIONS Valy Fontil^{2, 3}, Courtney Lyles^{2, 3}, Dean Schilling^{2, 3}, Sara Ackerman^{1, 2}, Margaret A. Handley^{2, 3}, Kirsten Bibbins-Domingo^{2, 3}, Gato I. Gourley^{2, 3}, Urmimala Sarkar^{2, 3}. ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³Center for Vulnerable Populations, San Francisco, CA. (Tracking ID #2198800)

BACKGROUND: Use of clinical performance measures based on practice guidelines increasingly plays an integral role in the provision of medical care. However, it is unclear how healthcare institutions and clinicians respond to evolving practice guidelines which necessitate changing measures of performance. Changes in practice guidelines may be especially challenging to resource- limited healthcare institutions which lack infrastructure, in terms of personnel and technology, needed for quality measurement. The recent 2013 American College of Cardiology/American Heart Association (ACC/AHA) cholesterol treatment guideline changed current standards for both clinical practice and performance measurement, moving away from a numeric low-density-lipoprotein (LDL) target towards a risk-calculation approach. Within California's public hospital systems, these new guidelines came in the middle of an ongoing statewide focused quality improvement (QI) effort aimed at reaching the existing LDL target. This offers a unique opportunity to examine how healthcare leaders, QI professionals, and clinicians at these safety net systems respond to changing guidelines.

METHODS: Through the Public Healthcare system Evidence Network and Innovation eXchange (PHoENIX) initiative we performed six focus group interviews with representatives of California's 21 public hospital systems to explore reactions to the recent, 2013 ACC/AHA cholesterol treatment guideline and understand the impact on performance reporting and QI. Purposive sampling was used to recruit frontline staff, managers, administrators, and clinicians working on data management and reporting from these organizations' membership for the focus groups. The interview process and subsequent qualitative analysis was informed by grounded theory without specified a priori hypotheses.

RESULTS: The new cholesterol guidelines were seen as controversial and inconsistent by some participants but generally accepted as evidence-based. We identified three common reactions to the guideline: lost momentum for current cholesterol QI efforts; confusion leading to disparate views and clinician behaviors with regards to cholesterol management and performance measurement; and calls for more flexibility with latitude for institutions to set their own quality goals. Reported challenges to implementing the new guideline included: inadequate data infrastructure to move from LDL targets to medication prescription as a performance measure, lack of organizational infrastructure for disseminating and implementing new guidelines, and limited funding and staffing for simultaneously implementing a new performance measure and undertake quality improvement efforts based on the new guideline.

CONCLUSIONS: The combination of cholesterol performance reporting requirements and changing guidelines led to quality improvement inertia and increased practice variations in healthcare safety-net settings. Implementing a new performance measure in response to changing guideline can be a resource-intensive process that could limit a system's capacity to undertake quality improvement efforts for better patient care. A new approach that shifts focus away from reporting quality measures to participation in quality improvement efforts to optimize management of cholesterol may be warranted.

Exhibit 1. Attitudes and reactions to the 2013 AHA/ACC cholesterol guidelines in the California healthcare safety net

Exhibit 1. Attitudes and reactions to the 2013 AHA/ACC cholesterol guidelines in the California healthcare safety net

Reaction	Representative quote(s)
Guidelines recommendations seen as controversial and inconsistent by some participants but generally accepted as authoritative	<p>“Well, these are the “guidelines.” Following the guidelines is less resource intensive than not following them, the latest guidelines, right? So we were in favor of, well, we’re going to move our system forward with whatever we can.”</p> <p>“The risk factor calculator guidelines and what percentage you start putting patients on moderate to high-dose statins is debatable... Britain guidelines are different than American guidelines and blah, blah....ACC guideline and the risk calculator starts at 40 years old. So anyone between 19 and 39 you get a nice little message from the calculator that says, “By the way, it’s invalid but thanks for trying.”</p>
Current performance measurements and QI goals now seen as invalid and unenforceable	<p>“When the guidelines came out last year, the medical director of our patient care and medical home called me and said ‘what am I supposed to do with this?’ Was being held to this particular metric for DSRIP and this new evidence came out, and I can tell you up front our physicians really care about the evidence and we’re probably not going to get much support for the LDL metric.”</p>
Sense of confusion and lack of direction for cholesterol management and performance measurement	<p>“So I think when the guidelines aren’t very clear, then you have the physicians practicing all over the map. So I think that’s part of the problem with the new lipid guidelines.”</p> <p>“Even in the same clinic, we have clinicians that don’t agree about how they want to do this now.”</p> <p>“So as far as the number goes, it’s pseudo proxy kind of but I feel like we need guidance as far as, okay, look, if we’re going to go with statins, yes or no, then we need to go ahead and say something so that people could evaluate. “Okay, what does this mean to us? What’s our risk? Is it doable or not?” This is doable, this is buildable. This is not buildable”</p> <p>“So I think it just made it, without commenting on the guidelines, it just made it a challenge...having a moving standard in terms of focusing every body’s attention on the same goal... I think that’s really where we are—is probably not having clarity of focus I think that we would like to have because of the change.”</p>
Performance measuring and QI based on the new guidelines for cholesterol management will be challenging	<p>“We talked about—and we actually measure percent reduction, it’s that one way of looking at it, that’s much more complicated to do. Then looking at statin usage and looking at high intensity versus moderate intensity dosaging to see whether or not that’s a good measure for this particular new guideline or not. If that is the case, how do we actually get that data because do you look at prescribing data? Did the patient actually pick up the medication? I mean that gets really complicated I think.”</p>
calls for more flexible performance measures and institutional partnerships to produce their own standards and performance metrics	<p>“One thing I would like to see in the future is maybe a little bit more flexibility in terms of how the metrics are defined so that the metric can accommodate changes in guidelines over time...”</p> <p>“What I’m trying to say, even as an institution or an organization or neighboring facilities, let’s at least, for our geographical, with 200 miles of each other, what are we going to do with our neighbors or something like that? What are going to report or something to try to develop some unity?”</p>

TREATING OLDER MEN WITH LOCALLY ADVANCED PROSTATE CANCER—IS IT UNDERUSE OR CLINICAL JUDGEMENT? Stephen Supoyo⁴; Simon Hall⁴; Richard Stock⁴; Gerald P. Hoke¹; William Oh⁴; Kezhen Fei²; Rebeca Franco³; Nina A. Bickell³. ¹Columbia University Medical College, New York, NY; ²Mount Sinai School of Medical, New York, NY; ³Mount Sinai School of Medicine, New York, NY; ⁴Ichan School of Medicine at Mount Sinai, New York, NY. (Tracking ID #2198643)

BACKGROUND: Prostate cancer (PCa) predominantly affects older men ≥ age 65y, yet they are less likely to receive appropriate treatment than younger men <65y. Definitive treatment is recommended for all patients with locally advanced intermediate and high D’Amico risk PCa. We aimed to identify reasons older men may not receive definitive PCa treatment.

METHODS: We reviewed medical records of 649 men diagnosed and treated for a new, locally advanced PCa (Gleason ≥ 7, stage ≥ IIA) from 2007–2012 at an inner-city tertiary referral and a municipal hospital. We compared demographics, PCa characteristics, comorbidities at time of diagnosis, and low or high 9 year overall mortality risk (≤ 16 % or > 16 %), as predicted by the Schenberg ePrognostic Index, for men ≥ 65y (n=431) vs <65y (n=218). Evidence-based quality measures for PCa treatment defined underuse of definitive treatment as ADT monotherapy or no surgery, radiation or cryotherapy.

RESULTS: Men’s average age was 61y (±8.8), 56 % were black, 44 % white, 8 % had Medicaid. Of older men, 57 % had surgery and 26 % radiation therapy, compared to 88 and 8 %, respectively, of the younger men (p<.0001). Median overall 9y mortality risk was 16 % in younger vs. 26 % in older men (p<.0001). Older men were more likely than younger men to have intermediate D’Amico PCa risk, 24 % vs 12 % (p<.0001). Fifteen percent of older men compared to 4 % of younger men experienced underuse (p<.0001). However, among older men, 6 % of those with low 9y mortality risk experienced underuse compared to 18 % of those with high mortality risk (p=.03). A greater proportion of men with high mortality risk had intermediate vs high D’Amico PCa risk (61 % v 45 %; p=.004). Multivariate modeling (c=.89; p<.0001) found that age was not associated with underuse; Intermediate D’Amico risk PCa (OR=9.81 among men with low mortality risk) and black race (OR=7.27; 95%CI: 2.2–24.5) was associated with greater underuse, while having commercial insurance was protective (OR=0.14; .07–0.3).

CONCLUSIONS: Age is not a risk factor for underuse. Rather, PCa risk affects treatment rate and life expectancy modifies this effect, suggesting that physicians utilize these factors in their treatment decisions regardless of patient age. Nonclinical factors such as patient access to treatment and race also affect underuse.

TREATMENT PATTERNS FOR OLDER VETERANS WITH LOCALIZED PROSTATE CANCER Richard Hoffman^{3, 4}; Ying Shi¹; Stephen Freedland⁵; Nancy L. Keating⁶; Louise Walter^{1, 2}. ¹San Francisco VA Medical Center, San Francisco, CA; ²University of California, San Francisco, San Francisco, CA; ³Albuquerque VA Medical Center, Albuquerque, NM; ⁴University of New Mexico School of Medicine, Albuquerque, NM; ⁵Duke University, Durham, NC; ⁶Harvard Medical School, Boston, MA. (Tracking ID #2190732)

BACKGROUND: Practice guidelines have discouraged actively treating prostate cancers diagnosed in men with limited life expectancies and/or low-risk tumors. However, population-based SEER-Medicare data indicate that substantial proportions of older men with prostate cancer, regardless of comorbidity or tumor characteristics, undergo surgery or radiotherapy. We evaluated VA treatment patterns for older veterans with localized prostate cancers, including those with low-risk tumors.

METHODS: We used national VA Cancer Registry data to identify men aged 65+ diagnosed with clinically localized prostate cancer between 1/1/03 and 12/31/08. We obtained baseline data on demographics, tumor characteristics, comorbidities, and initial treatment within 6 months of diagnosis (radical prostatectomy, radiotherapy, primary androgen deprivation therapy [PADT], no active treatment). National VA surveys provided facility data, including academic affiliation, availability of oncologic specialists, and distance to radiotherapy facilities. We used multinomial regression analyses to determine associations between patient and facility characteristics with treatment selection for men with localized and low-risk (stage ≤ 2a, PSA < 10 ng/mL, Gleason ≤ 6) cancers, respectively.

RESULTS: Seventeen thousand two hundred six veterans had localized prostate cancer; 32 % age 75+, 76 % white, 59 % married, 12 % comorbidity scores ≥ 3. Overall, 39 % received radiotherapy, 6 % surgery, 20 % PADT, and 35 % no active treatment. Older and

sicker men were less likely to receive surgery or radiotherapy vs. no active treatment, but more likely to receive PADT. Higher clinical stage, PSA levels, and Gleason scores predicted receiving active treatment. Over time, use of PADT decreased from 22 to 16 % while the proportion receiving no active treatment increased from 33 to 40 %, $P<0.001$. Facility characteristics, including availability of specialists and academic affiliations, were not significantly associated with treatment selection. About 1/3 of the cohort ($n=5616$) had low-risk prostate cancer; no active treatment (48 %) was the most common option, followed by radiotherapy (37 %). Older and sicker men were less likely to receive surgery or radiotherapy than no active treatment; older men were more likely to receive PADT. Over time, significantly more men with low-risk prostate cancer received no active treatment (41 to 57 %) and fewer received PADT (11 to 4 %), $P<0.001$.

CONCLUSIONS: VA treatment patterns followed evidence-based guidelines against treating older and sicker men with surgery or radiotherapy, for decreasing use of PADT, and for increasingly withholding active treatment, particularly for men with low-risk prostate cancer. Our findings suggest the potential value of an integrated health care system in reducing unnecessary utilization, though there is still considerable room for improvement.

TRENDS IN ECHOCARDIOGRAPHY UTILIZATION IN AN INTEGRATED DELIVERY SYSTEM Dipesh Amin³; Arthur Davidson¹; Susan Shetterly⁴; Elizabeth A. Bayliss². ¹Denver Health, Denver, CO; ²Kaiser Permanente and University of Colorado, Denver, CO; ³University of Colorado School of Medicine, Aurora, CO; ⁴Kaiser Permanente, Denver, CO. (Tracking ID #2198429)

BACKGROUND: Echocardiography is indispensable for evaluating cardiovascular function. Inappropriate and repeat testing contributes to healthcare costs and may not improve patient outcomes. Previously published reports show frequent repeat testing in Medicare fee-for-service beneficiaries. The Choosing Wisely campaign of the American Board of Internal Medicine recommends against routine follow up imaging in patients who have mild disease without symptoms. Fee-for-service reimbursement, patient demand, geographic variation and provider uncertainty may all drive increased utilization. Despite the economic and clinical importance of echocardiography, little is known about testing trends in an integrated healthcare system. We examined the trends in utilization and repeat testing in an integrated health system with salaried providers and a shared electronic health record.

METHODS: We examined patterns of repeat echocardiography in a retrospective cohort of adults 18 years and older receiving an initial index echocardiogram from January 1, 2007 to December 31st, 2010. The sample was divided into 4 annual inception cohorts and repeat echocardiograms defined as those completed within 3 years of index echocardiogram. We required a full year of enrollment without an echocardiogram prior to index. Those with diagnoses of congenital heart disease were excluded. Using Kaplan Meier survival analyses censoring for repeat testing and health plan disenrollment, trends of repeat testing over time were examined. Cox regression proportional hazard analysis was used to assess repeat echocardiogram as a function of cohort year adjusting for age, gender, specific diagnoses for which echocardiograms are indicated, and insurance type.

RESULTS: Twenty-four thousand five hundred thirty-nine patients received an index echocardiogram between 2007 and 2010. The average age was 64 years and 53.8 % were female. Repeat echocardiograms were performed in 25.1 % ($N=6156$) of patients. The average age of those with repeat was 68 years and 50 % were female. The unadjusted likelihood of having a repeat echocardiogram was lower in the 2009 and 2010 cohorts compared to the 2007 cohort (Hazard Ratio 0.82; 95 % CI: 0.74 to 0.91 and HR 0.80; 95 % CI: 0.72 to 0.89 respectively). Of those ordered in the outpatient setting ($N=10,196$), patients of cardiologists and other specialties were more likely to obtain repeat echocardiograms compared to internal medicine (Adjusted HR 1.66; 95 % CI: 1.51 to 1.82 and HR 1.50; 95 % CI: 1.34 to 1.68 respectively). After adjusting for age, gender and common cardiac conditions, those with high and standard deductible plans had decreased hazard of repeat echocardiogram (HR 0.68; 95 % CI: 0.53 to 0.88 and HR 0.64; 95 % CI: 0.58 to 0.72 respectively) relative to those with Health Maintenance Organization (HMO)/Medicare Advantage plans (Table 1).

CONCLUSIONS: The odds of obtaining a repeat echocardiogram do not appear to be increasing over time in this integrated healthcare delivery system. Patients enrolled in this system are more likely to have a repeat echocardiogram if older and have an HMO insurance plan. Deductible and high deductible plans decrease repeat testing over time. Outpatients seen by cardiologists and other specialists are more likely to undergo repeat testing, possibly due to higher disease severity.

Table 1: Adjusted HR of obtaining repeat echocardiogram (N=24,539)

	Adjusted HR* (95% CI)	Adjusted HR** (95% CI)
2007 (N=6456)	ref	ref
2008 (N=6267)	1.00 (0.94, 1.07)	1.02 (0.95, 1.08)
2009 (N=5923)	0.89 (0.83, 0.96)	0.92 (0.85, 0.98)
2010 (N=5893)	0.91 (0.85, 0.98)	0.95 (0.88, 1.02)
Female (N=13208)	1.21 (1.15, 1.27)	1.21 (1.15, 1.27)
CHF (N=4632)	1.53 (1.43, 1.64)	1.53 (1.43, 1.63)
Aortic disease (N=895)	1.20 (1.07, 1.35)	1.20 (1.07, 1.34)
Valvular disease (N=7818)	1.56 (1.48, 1.65)	1.56 (1.48, 1.65)
Pulmonary HTN (N=3130)	1.27 (1.18, 1.36)	1.26 (1.18, 1.35)
Cardiomyopathy (N=1666)	1.54 (1.42, 1.68)	1.54 (1.42, 1.68)
HDHP vs HMO (N=400)		0.68 (0.53, 0.88)
DHP vs HMO (N=2656)		0.64 (0.58, 0.72)
Other vs HMO (N=492)		0.70 (0.55, 0.88)

*Hazard Ratio adjusted for age, gender, and cardiac disease

**HR adjusted for age, gender, cardiac disease, and insurance

CHF=Congestive Heart Failure; HTN=Hypertension;

HDHP=High-Deductible Health Plan; DHP=Deductible Health Plan; HMO=includes Medicare beneficiaries including all Medicare Advantage

TRENDS IN MEDICAID REIMBURSEMENT AND REFERENCE PRICES FOR INSULIN: 1991–2014 Jing Luo²; Jerry Avorn³; Aaron Kesselheim¹. ¹Brigham and Women, Boston, MA; ²Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women's Hospital / HMS, Boston, MA; ³Harvard Medical School, Boston, MA. (Tracking ID #2200691)

BACKGROUND: Insulin has been used to treat diabetics for over 90 years, yet no generic insulin product is available in the United States today. Lack of generic competition may keep drug prices high, so we sought to assess recent trends in Medicaid reimbursements and reference prices for insulin products.

METHODS: We first identified all insulin products continuously available to US patients since 2006, excluding discontinued products and those sold by repackagers (and Humulin R U-500). The 16 insulin products were then grouped by duration of action according to American Diabetes Association Guidelines and by patent status as of January 2013. Finally, we obtained annual Average Wholesale Prices for these products using Redbook from 1991 to 2014 and tracked quarterly Medicaid reimbursement for each product during the same period using the Centers for Medicare and Medicaid's aggregated drug spending data, adjusting for inflation using annual Consumer Price Indexes. We used linear regression to compare trends in reimbursements for patented and non-patent-protected insulins.

RESULTS: Medicaid reimbursement for currently-available insulin products has risen steadily per unit dispensed since 1991 (Figure 1). In the early 1990s, Medicaid reimbursed pharmacies approximately \$3/100u. By 2014, reimbursement rose to under \$8/100u for short-acting and intermediate insulins, \$15/100u for pre-mixed insulins and approximately \$20/100u for long-acting and rapid-acting analogues. The rate of increase in reimbursement was higher for patented than non-patent-protected insulins ($p<0.001$). Listed average wholesale prices increased in a manner almost identical to Medicaid reimbursements.

CONCLUSIONS: There was a nearly exponential upward trend in Medicaid payments and reference prices for a wide variety of insulin products over the past decade. This trend was consistent across all patent statuses, formulations, or durations of action of insulin products. These results suggest a lack of robust price competition in the insulin market in the United States, likely attributable to the lack of generic competition. These data indicate that the usual expectations of marketplace pressure and price competition after patent expiration are not functioning as some would predict, rendering this essential medication class less affordable for millions of patients.

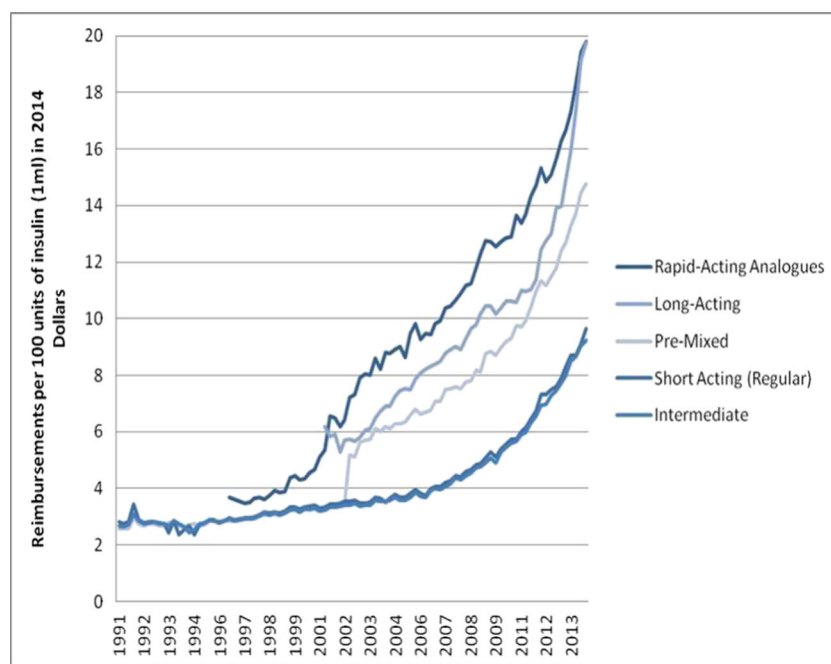


Figure 1: Trends in Medicaid reimbursements by type of insulin from 1991 to 2014 (adjusted for inflation).

TROPICAL MEDICINE—RE-EMERGENCE OF HOOKWORM IN RURAL UNITED STATES Megan L. McKenna; Dr. Rojelio Mejia. Baylor College of Medicine, Houston, TX. (Tracking ID #2200065)

BACKGROUND: Parasitic gastrointestinal infections cause devastating effects on populations worldwide, including significant stunting in children repeatedly exposed to diarrheal diseases, as well as significant iron deficiency anemia (most commonly caused by hookworm), leading to impaired cognitive development in children. According to a study in the 1950s, rural Alabama suffered from a high prevalence of hookworm infection in schoolchildren, with counties as high as 60 % infection. However, due to improved sanitation methods and waste disposal, the incidence has decreased significantly. According to the Alabama Center for Rural Enterprise (ACRE) work plan, there are still environmental conditions with concerns for poor or no sanitation systems with open sewage close to dwellings. Due to these conditions, a more current investigation using modern molecular diagnostics is warranted to determine possible recurrence of gastrointestinal parasitic infections.

METHODS: Areas with poor sanitation were selected. The team visited these areas of residence to conduct a survey and collect data, and then follow up to collect samples (stool and environmental samples). Stool samples from 56 patients (ages 8 to 60 years old) and 34 soil samples were collected, with the following exclusion criteria: those who have traveled to endemic areas, children under 2 years of age, and no HIV or immunocompromised status patients were evaluated. Multi-parallel qualitative real-time PCR were run in duplicate for all patients, including positive, negative, and internal controls, as well as standards to determine parasite burden in each sample. The threshold for positivity was set at 38 cycle thresholds (Ct) and this value was the limit of detection for our dynamic range of positive standard curves.

RESULTS: Stool samples showed 20 (35.7 %) positive results were found for *Necator americanus*, 4 (7.7 %) positives for *Strongyloides stercoralis*, and 1 (1.7 %) for *Entamoeba histolytica* (Figure 1). Soil samples were positive for 1 (2.9 %) *Cryptosporidium* species. Subsequent stool studies using microscopy ova and parasite techniques were negative for 20 of the infected patients.

CONCLUSIONS: By using multi-parallel qualitative real-time PCR, several gastrointestinal parasites known to be endemic to developing countries have now been identified in a resource poor county in Alabama, among people who have never traveled abroad previously. This was a small preliminary study using a proven and field-tested novel assay. The burden of parasitic infection was low and may explain the microscopic lack of parasitic evidence. As shown in the 1950's Alabama study, Hookworm infection rates were as high as 60 % in some of the more poverty-stricken communities. After treatment

of those infected and improvement of sanitation, these pockets of infection were thought to have resolved. However, given continued poor sanitation and advancement of detection methods (improved sensitivity with PCR compared to microscopy), low burdens of infection have been discovered in the United States among populations who have never left the country. This begins to shift the idea behind global health. One concept is the Blue Marble Health Collection (Peter Hotez), which finds that many of the world's neglected tropical diseases are paradoxically found in some of the wealthiest countries, especially in these small regions of extreme poverty. As world travel becomes more widely available, opening access to poverty stricken communities both abroad and at home, and with the introduction of more advanced diagnostic techniques, emergence of rare, endemic infections may eventually become less defined by geographic location, but more by economic status of visited areas.

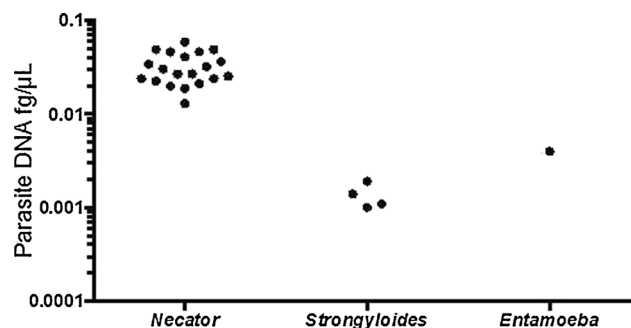


Figure 1. Parasite DNA fg/μL in stool samples from rural Alabama

TRUST AND FUNCTIONAL STATUS PREDICT PATIENTS' ADHERENCE TO PHYSICIANS' RECOMMENDATIONS IN A PROSPECTIVE COHORT OF VETERANS WITH HEART FAILURE Howard Gordon^{2, 1}; Oksana Pugach¹; Marvella E. Ford³. ¹University of Illinois at Chicago, Chicago, IL; ²Veterans Affairs Medical Center, Chicago, IL; ³Medical University of South Carolina, Charleston, SC. (Tracking ID #2197769)

BACKGROUND: Heart failure outcomes may improve when patients are more adherent to physicians' recommendations for medications and lifestyle modifications. Patients who

have more trust in physicians may be more adherent to physicians' recommendations, yet the relationship between patients' trust in physician and adherence is not well studied.

METHODS: Participants ($N=149$) were from a prospective cohort study in which patients with heart failure (HF) were followed at two visits within 6 months after hospital discharge at two Veterans Affairs medical centers. Patients with dementia, discharged to a nursing home, or whose HF was secondary to another condition were excluded. Patients completed self-report questionnaires on demographics, functional status, ratings of the doctors' informativeness and supportiveness, ratings of their own communication self-efficacy, trust in physician and adherence to physicians' recommendations regarding treatment for heart failure. Trust in physician was measured with a five item scale administered in clinic before and after each visit ($\alpha=0.82$). Adherence was measured with a five-item scale administered by telephone 4 weeks after each visit. All self-report measures were normalized to a 100-point scale. Visits were audiorecorded and later transcribed. Transcriptions were coded and the number of utterances for elements of physicians' patient centered and informed decision making communication and patients' participatory communication behaviors were quantified. In our analysis, we examined the bivariate relationship of several factors with adherence using mixed-effects regression models with random intercept. The independent predictors of adherence were examined with three steps of data modeling using backward elimination for variables with $P>0.20$ at each step. Significant demographic and clinical predictors of adherence were identified in the first step. Next, significant self-reported communication variables were identified. Last, significant communication behaviors were added to the model.

RESULTS: Adherence was higher in older patients for each additional year of age (0.34 %, $P=0.04$) and was higher for patients reporting higher functional status (0.19 %, $P=0.0004$). Adherence was not significantly different for Blacks or Hispanics, was not significantly different according to education, income, or marital status, and was not significantly different in patients who had the same doctor at both visits, or according to study site ($P>0.40$). Higher ratings of self-reported self-efficacy to communicate and post-visit doctor trust were significantly associated with higher self-reported adherence (0.18 %, $P=0.045$; and 0.20 %, $P=0.03$, respectively). Patients' question-asking and physicians' partnership-building communication behaviors were inversely associated with adherence (-0.39 utterances, $P=0.03$; and -0.42 utterances, $P=0.048$, respectively). In multiple regression analysis using backward elimination, functional status, age, education, trust in physician, and physician communication behaviors (partnership-building and recommendations) were retained in the final model, but only functional status and post-visit trust in physician were significant predictors of adherence to physicians recommendations 4 weeks after the visit (0.20 %, $P=0.0003$; and 0.25 %, $P=0.009$).

CONCLUSIONS: In this sample of Veterans with heart failure, age, functional status, patients' ratings (self-efficacy and post-visit trust in physician) and communication behaviors (patients' questions and physicians' partnership-building) were significantly associated with self-reported adherence. Specific communication behaviors were inversely associated with adherence suggesting that physicians and patients may have had higher rates of these communication behaviors when anticipating lower adherence. Nonetheless, in regression analysis communication behaviors were not independently associated with adherence, whereas functional status and patients' ratings of trust in physician measured after medical visits were independently associated with self-reported adherence measured 4 weeks later. Although the study was observational and the findings are primarily correlational, these findings are strengthened by the longitudinal study design in which independent variables such as the trust measure were measured at two time points.

TUBERCULOSIS SCREENING FOR DIABETIC PATIENTS IN COMMUNITY CLINICS IN KUNMING, CHINA Alanna Stone⁵; Li Ling^{1, 4}; Anh Innes^{1, 3}; Xu Lin². ¹CAP-TB, USAID Regional Development Mission Asia, Bangkok, Thailand; ²Yunnan Center for Disease Control and Prevention, Kunming, China; ³Family Health International, Bangkok, Thailand; ⁴Family Health International, Kunming, China; ⁵University of California, San Francisco, San Francisco, CA. (Tracking ID #2194674)

BACKGROUND: China has a rising epidemic of diabetes mellitus (DM) with a prevalence of 11.6 %, representing up to 113.9 million people. China also has an estimated 12 million cases of tuberculosis (TB). Diabetic patients have up to a 3-fold increased risk of developing active TB in addition to higher risk of TB treatment failure and even death. The present intervention was developed through the USAID Control and Prevention of TB (CAP-TB) project from FHI 360 in conjunction with partners the International Union Against Lung Disease and Tuberculosis and the Yunnan Anti-TB Association as a method to increase detection of TB in high-risk groups. This study aims to determine whether a simple screening tool for TB can be implemented by primary care providers in community clinics in Kunming, China to increase TB case detection in diabetic patients. Primary Objective: To build health workforce capacity of primary care providers in the region to improve diagnosis and treatment of TB among high-risk groups. Secondary Objective: To

determine whether TB screening in diabetic patients by primary care providers should be recommended in China.

METHODS: Primary care physicians and nurses at 5 designated district health centers and 5 sub-centers in the Xishan District of Kunming, Yunnan Province, China were trained to screen diabetic patients for TB. A symptom questionnaire was used at each clinic visit for each diabetic patient: cough for >2 weeks, night sweats for ≥ 4 weeks, fever for ≥ 4 weeks, weight loss over the previous 4 weeks, and symptoms of extra-pulmonary TB. A "yes" answer to any of these questions generated a referral for evaluation in the district TB clinic. Data were collected monthly on number of diabetic patients screened, number of positive screens, patients referred to and seen at the district TB clinic, and the number of patients diagnosed with TB. From this data, the case notification rate was determined. In addition to quantitative data collection, quarterly site visits were conducted to elicit initial success with enacting the screening protocol as well as to discuss barriers to screening with the trained providers.

RESULTS: From June 2013 to April 2014, 2942 diabetic patients were screened for TB in the designated clinics. Of these, 278 patients had TB symptoms and 209 patients arrived at TB clinic for diagnostic testing resulting in 3 confirmed cases of TB. Six patients had positive symptom screens but had chest x-rays that were read as inactive or old TB. The case notification rate was 102 per 100,000 screened as compared to a baseline notification rate in the general population of Yunnan province of 55 per 100,000.

CONCLUSIONS: Providers at health centers in Kunming, China are able to implement a simple protocol integrating TB screening into diabetes care. However, while many diabetic patients were screened, few screened positive resulting in a relatively low case notification rate. Success of implementation (measured by number of patients screened) also varied between sites. Poor provider understanding of reasons for screening, including risk factors for and symptoms of TB, was a barrier to successful detection. Other barriers included poor integration of screening into provider workflow and patient resistance to referral for diagnosis. Ongoing provider and patient education is needed on early case detection of TB and the importance of active screening for timely diagnosis and treatment of TB among diabetic patients. Screening for TB in diabetic patients in areas of high prevalence of both diseases is likely important to decrease the incidence of TB. However, even among those referred for TB diagnosis, relatively few had active TB. More information is needed to determine the most cost-effective and efficient means to screen these high-risk patients for TB. In the future, a new intervention aimed at focusing on patients at the hospital level in diabetic outpatient clinics (as opposed to community primary care settings) in Kunming will be piloted. Other interventions may also prove to be more effective, such as targeting a certain hemoglobin A1C to stratify for those with poorly controlled diabetes. Data on screening thus far has not been sufficient to recommend wider implementation, but it is necessary to continue to pursue new strategies as diabetes becomes a greater issue in areas of high TB prevalence.

TWICE THE IMPACT—A FDP THAT COMBINES CLINICAL AND EDUCATIONAL SKILL LEARNIN Lynn Bui³; Anne Dembitzer¹; Verity Schae²; Frank Volpicelli³; Binhuan Wang³; Audrey Grask²; Mark D. Schwartz¹. ¹NY Harbor VA, New York, NY; ²NYU School of Medicine, New York, NY; ³New York University, New York, NY. (Tracking ID #2198000)

BACKGROUND: Clinician educators (CE) are the primary teachers of medical students and residents on the wards, yet most have not had formal training in education. CE are interested in improving their teaching skills but often choose to attend clinical rather than educational CME programs. We sought to determine the impact of including teaching skill learning in a clinically focused longitudinal faculty development program (FDP) on participants teaching skill confidence and performance, and self-reported behavior change.

METHODS: We recruited hospitalists from 3 institutions to participate in an 8 month-long FDP. The FDP consisted of five 3-h sessions; a pre and post 3-station OSTE, and three workshops. Clinical content was selected based on a faculty's needs assessment. The educational component was based on learner's feedback. We created 3 workshops: 1. Performing Lumbar Puncture/how to teach procedures; 2. Dermatologic examination/observation and feedback; and 3. Inpatient pain management/using Microskills on ward rounds. Teaching skill performance was assessed using pre and post OSTEs. Standardized learners rated teaching performance using a checklist. Domains included general teaching skills (learning climate, control of session, assessment, instructional skills, and feedback), and workshop specific teaching and clinical skills; items were rated as "not done", "partly done" or "well done". Change in teaching and clinical skill confidence was assessed after each workshop using a retrospective pre post survey using a 4 point scale from "not

confident" to "very confident". Participants completed commitment to change (CTC) statements after each workshop.

RESULTS: Eighteen hospitalists completed the program, 65 % male with an average of 4 years in practice (range 1 to 8 years). Participant confidence, as measured by the retrospective pre-post assessments, improved in all areas: confidence in clinical skills improved for lumbar puncture from 11 to 53 % very confident ($p=0.0006$); the dermatologic exam 12 to 38 % very confident ($p=0.002$); and managing pain 37 to 60 % very confident ($p=0.007$). Confidence in teaching skills improved for teaching procedures 2 to 56 % very confident ($p=0.00007$), observation and feedback 26 to 46 % very confident ($p=0.01$) and using Microskills on ward rounds 4 to 48 % very confident ($p=0.005$). OSTE teaching skill performance improved for clinical skills; teaching the dermatologic examination 40 to 67 % well done ($p=0.002$) and teaching pain management 37 to 60 % well done ($p=0.007$). Educational skill performance also improved for observation and feedback 42 to 85 % well done ($p=0.00003$), and general teaching skills improved in learning climate (62 to 73 % well done, $p=0.03$), control of session (56 to 73 % well done, $p=0.008$) and instructional skills (50 to 69 % well done, $p=0.001$). At the end of the FDP, participants implemented 56 % and partially implemented 44 % of their goals focused on changing clinical practice and implemented 16 % and partially implemented 58 % of their goals focused on teaching behaviors.

CONCLUSIONS: Combining education skills with clinical skill learning for CE FDP can meet the clinical needs of busy CE and the educational needs of residency and medical schools. Combined programs may increase CE interest in participation and can improve teaching confidence, teaching performance and self reported teaching behavior. Pragmatic designed faculty development in medical education has the potential to change the clinical and teaching culture at an institution.

TWO YEAR FOLLOW-UP OF THE EFFECTIVENESS OF A MULTIFACETED INTERVENTION TO IMPROVE ADHERENCE TO ANNUAL COLORECTAL CANCER SCREENING IN COMMUNITY HEALTH CENTERS David W. Baker^{1,1}; Tiffany Brown^{1,1}; Shira N. Goldman^{1,1}; David T. Liss^{1,1}; Stephanie Kollar²; Kate Balsley²; Ji Young Lee^{1,1}; David R. Buchanan². ¹Northwestern University, Chicago, IL; ²Erie Family Health Center, Chicago, IL. (Tracking ID #2198292)

BACKGROUND: Colorectal cancer (CRC) screening is recommended for adults age 50–75. One recommended screening modality is annual fecal occult blood testing (FOBT). A previous study, conducted within a network of community health centers (CHC) found that a multifaceted outreach intervention achieved 82 % adherence to annual FOBT. However, it is unclear whether that high adherence rate can be maintained over time. The main objectives of this study were to determine adherence to annual FOBT during a second round of outreach and to determine the overall adherence to CRC screening by any modality over the entire study period.

METHODS: This was a cohort study conducted within a network of CHCs following all 225 patients assigned to intervention group in the original randomized controlled trial (RCT). The RCT was stopped after one year because of the far greater adherence rate in the intervention group, but we continued to follow the intervention group and conduct outreach as originally planned. Of the 124 patients who completed FOBT within 6 months of their due date during the first wave of outreach; 90 % were Latino, 87 % preferred to speak in Spanish, and 77 % were uninsured. Outreach consisted of 1) a mailed reminder letter, a free fecal immunochemical test (FIT) with a postage-paid return envelope, 2) an automated phone and text message, 3) automated phone and text reminders 2 weeks later for those who did not return the FIT, and 4) outreach by a CRC screening navigator after 3 months. Outreach was delivered on a rolling basis based on a patient's due date for FIT. The main outcome measure was completion of FIT within 6 months of the due date for annual screening as collected via electronic health record query. A secondary measure was a composite outcome of adherence to CRC screening over the entire 2 year follow up period.

RESULTS: A total of 88.7 % of patients completed a second annual FIT within 6 months of their due date. Of the 110 who completed the FIT, 90 (81.8 %) completed this within the first 3 months without the need for calls from the CRC screening navigator. When these results were combined with the results of the first year of follow-up, 71.6 % of the original 225 intervention patients were fully up to date on CRC screening, and another 11.1 % had been screened, although the timing or number of FITs completed was suboptimal; 17.3 % had no screening or inadequate screening. Of the 24 subjects with a positive FIT

over the course of the study, 13 (54.1 %) had documentation of a completed diagnostic colonoscopy.

CONCLUSIONS: It is possible to achieve high rates of CRC screening over a 2-year period for vulnerable populations using outreach with FIT as a primary strategy. Although it is possible that adherence rates will wane over time, the available evidence suggests that FOBT (i.e., FIT) is a viable strategy to improve CRC screening rates for vulnerable population if outreach strategies such as the ones in this study are used. However, to reduce mortality, studies are needed to identify strategies to achieve much higher rates of colonoscopy for patients whose FITs are positive.

TYPOLOGIES OF VA AND MEDICARE UTILIZATION AMONG DUALY ENROLLED VETERANS WITH TYPE 2 DIABETES: A LATENT CLASS ANALYSIS Thomas R. Radomski^{4,2}; Xinhua Zhao²; Carolyn T. Thorpe^{1,2}; Chester Good^{2,4}; Maria Mor^{2,5}; Michael J. Fine^{2,4}; Walid F. Gellad³. ¹University of Pittsburgh, Pittsburgh, PA; ²VA Pittsburgh Healthcare System, Pittsburgh, PA; ³VA Pittsburgh/University of Pittsburgh, Pittsburgh, PA; ⁴University of Pittsburgh School of Medicine, Pittsburgh, PA; ⁵University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2196785)

BACKGROUND: Many elderly Veterans treated within the VA Healthcare System (VA) are also enrolled in Medicare and receive treatment outside VA (i.e. dual use). Dual use will likely increase as the Veterans Choice Act and Affordable Care Act enhance access for Veterans to outside care; however, such enhanced access also potentially fragments medical care. Little is known about the specific types of care dually enrolled Veterans receive in each system. Our goal was to determine the degree to which Veterans were dual users for specific types of diabetes care and to identify typologies of dual use using latent class analysis.

METHODS: We performed a cross-sectional retrospective cohort study using linked VA and Medicare Parts A, B, and D data from fiscal year 2009. We identified a cohort of community-dwelling Veterans age 65 or older who had type 2 diabetes, were continuously enrolled in VA and fee-for-service Medicare, and had at least one outpatient visit within VA in fiscal year 2009. We generated dichotomous indicators to represent any utilization of the following diabetes-specific healthcare services through VA and Medicare: outpatient visits, laboratory tests (hemoglobin A1C and urine microalbumin), glucose testing supplies, medications, inpatient admissions, and emergency department (ED) visits. We determined the number and percent of Veterans who were dual users for each service. Using latent class analysis (LCA), we established distinct classes of Veterans based upon their probability of utilizing VA or Medicare for their diabetes care. We tested models with increasing numbers of latent classes and used Bayesian Information Criterion and Entropy statistics to determine the model that best accounted for the observed patterns of dual use. In the final model, we removed ED and inpatient care due to low probabilities of dual use and minimal distinction between classes.

RESULTS: There were 405,286 Veterans in the overall cohort. The median age was 75.0 years, 98.7 % were male, 83.4 % were non-Hispanic white, and 71.8 % had one or more comorbidities in addition to diabetes. Of the sample, 16.9 % were enrolled in the Medicare Part D drug benefit. Overall, 202,305 (49.9 %) Veterans used both VA and Medicare benefits for at least one diabetes-specific service (dual use). Specifically, 153,110 (37.8 %) were dual users for outpatient visits, 61,141 (15.1 %) for laboratory testing, 19,230 (4.7 %) for testing supplies, and 16,517 (4.1 %) for medications. Only 1608 (0.4 %) and 162 (0.04 %) Veterans were dual users for ED and inpatient care, respectively. Latent class analyses identified 7 distinct classes of VA and Medicare utilization (Table 1). Veterans in classes 1, 2, and 3 were defined by their high probabilities of VA use and low probabilities of Medicare use. Veterans in class 1 ($n=206,691$; 51.0 %) were likely to use VA and not Medicare for all facets of their diabetes care. Veterans in class 2 ($n=37,704$; 9.3 %) were likely to use only VA outpatient and laboratory services and Veterans in class 3 ($n=16,798$; 4.1 %) were likely to use only VA outpatient care. Veterans in classes 4, 5, and 6 were defined by their high probability of utilizing both VA and Medicare services, although they differed in the specific services used. For example, Veterans in classes 4 ($n=76,128$; 18.8 %) and 5 ($n=42,909$; 10.6 %) were similarly likely to have VA outpatient visits and laboratory tests, but class 4 received their testing supplies exclusively through Medicare while class 5 received them primarily through VA. Veterans in class 7 ($n=9777$; 2.4 %) were defined by their Medicare reliance, having high probabilities of receiving their outpatient visits, laboratory tests, and supplies through Medicare.

CONCLUSIONS: We identified 7 overarching latent classes that account for the diverse ways in which dually enrolled veterans receive diabetes care. The differing patterns of dual use make it challenging to study this population as a single entity, as has typically been done. Each of these typologies may represent differing risks of care fragmentation that may impact cost, safety, and clinical outcomes.

Table 1: Probability of VA and Medicare Healthcare Use by Latent Class Among Elderly Dually Enrolled Veterans with Diabetes*

Latent Class:	1	2	3	4	5	6	7
N (%):	206,691 (51.0)	37,704 (9.3)	16,798 (4.1)	76,128 (18.8)	42,909 (10.6)	15,279 (3.8)	9777 (2.4)
Probability of VA use:							
Outpatient visits	0.98	0.88	0.63	0.97	0.97	0.97	0.67
Laboratory tests	0.96	1.00	0.00	0.81	0.84	0.93	0.12
Glucose testing supplies	0.81	0.19	0.18	0.00	1.00	0.16	0.08
Medications	0.96	0.35	0.35	0.65	0.86	0.86	0.37
Probability of Medicare use:							
Outpatient visits	0.12	0.13	0.18	0.93	0.91	0.44	0.88
Laboratory tests	0.01	0.03	0.05	0.60	0.57	0.06	0.58
Glucose testing supplies	0.02	0.02	0.04	0.69	0.24	1.00	0.60
Medications	0.01	0.02	0.02	0.17	0.13	0.09	0.25

*Probabilities over 0.50 are bolded.

UNDERSTANDING BARRIERS TO INTERPROFESSIONAL COMMUNICATION BETWEEN INTERNAL MEDICINE PROVIDERS DURING A PATIENT'S DISCHARGE PROCESS: A QUALITATIVE STUDY OF PATIENTS AND PROVIDERS Vincent A. Pinelli; Heather L. Stuckey; Jed Gonzalo. Penn State College of Medicine, Hershey, PA. (Tracking ID #2195970)

BACKGROUND: Patient transitions from the inpatient to outpatient setting are a vulnerable point in a patient's care. As a result, transitions of care are becoming an increasing focus of quality improvement initiatives. Limited work has investigated the perception of provider roles and the barriers to interprofessional communication during the discharge process. In this study, we sought to advance our understanding of frontline providers' attitudes and perceptions regarding: (1) providers roles, (2) barriers, and, (3) potential solutions in relation to interprofessional communication during the discharge process on internal medicine units.

METHODS: We performed an inductive content analysis of data obtained from focus group interviews ($n=9$) with frontline providers about the discharge process. From February-June 2014, focus group interviews were performed with house staff and attending physicians, nurses, consult service physicians, care coordinators and social workers, and other health professionals (physical and occupational therapists, pharmacists, and nutritionists). The semi-structured interviews consisted of open-ended questions and related to participants' perceived roles in the discharge process, perceptions of others' roles, identification of barriers to interprofessional communication, and suggested strategies to improve communication and collaboration during the discharge process. During data collection, investigators took field notes, and using open coding, identified categories and generated a preliminary codebook to facilitate analysis. Two investigators analyzed two transcripts together to modify and agree upon the codebook, followed by independent analysis of the remaining transcripts with regular adjudication sessions.

RESULTS: Our preliminary analysis revealed four major categories related to barriers, including: (1) communication and collaboration, (2) systems issues, (3) provider roles, and (4) medication reconciliation. For communication and collaboration, participants identified several key themes including lack of keeping other providers informed about discharge plans, lack of specific instructions for discharge needs, failure to keep updated progress notes, inability to find contact information for other providers, and provider absences from interdisciplinary rounds. For systems issues, participants reported limitations in time frames for patient transport, lack of bed availability for patient placement, challenges in navigating the electronic discharge instructions, and lack of continuity secondary to provider assignments/schedules. For provider roles, participants identified a poor understanding in other providers' roles and the perception that roles were poorly defined, including who is responsible for performing discharge-relevant tasks. For medication reconciliation, participants reported poor functionality of the electronic discharge form, as well as patient-specific education regarding medications. Potential solutions included increasing frequency and quality of interdisciplinary rounding, optimizing synchronous communication between providers, improving understanding about the defined roles for providers, primary team education of the patients and families regarding discharge planning, maintaining up-to-date progress notes regarding patient status (eliminating 'copy and paste' culture), and utilizing patient-specific discharge instructions.

CONCLUSIONS: Frontline medicine providers identified a number of issues related to interprofessional communication during a patient's discharge that limit ideal discharges, including a general lack of understanding others' roles, several systems issues preventing ideal patient education and timeliness of the discharge process, and ineffective communication patterns between providers during the discharge process. Although research has

investigated the perspectives of the discharging physician and recipient primary care providers, little research has focused on the interprofessional collaboration processes at the time of discharge, the understanding of which is critical for safe and efficient patient discharges. Although the focus of research and quality improvement initiatives is on medication reconciliation, primary care follow up, and patient education, the processes and coordination involved with completing these tasks are critical for success—these results from medicine units elucidate the challenges at the communication and collaboration interface that may contribute to discharge failures. This work identifies a wide variety of potentially remediable systems issues and educational opportunities to optimize the interprofessional collaboration during patient discharges to improve this transition period. Clarification of roles and responsibilities and promoting a mutual understanding amongst providers about the treatment and discharge plan on the day of discharge may improve this process.

UNDERSTANDING OUT-OF-ACO CARE IN THE MEDICARE SHARED SAVINGS PROGRAM Maria Han²; Carol Mangione¹; Robin Clarke³; Susan Ettner²; Neil Steers²; Mei Leng². ¹David Geffen School of Medicine at UCLA, Los Angeles, CA; ²UCLA, Los Angeles, CA; ³UCLA, Santa Monica, CA. (Tracking ID #2191333)

BACKGROUND: Designed by the Centers for Medicare and Medicaid Services (CMS), the Medicare Shared Savings Program (MSSP) encourages the formation of accountable care organizations (ACOs) as a mechanism for improving the quality of and reducing the cost of care provided to Medicare fee-for-service (FFS) beneficiaries. The MSSP emphasizes care coordination and provider accountability as keys to success in improving value in care. However, providers and pundits have voiced concern that the open-network design of the MSSP and resulting out-of-ACO care would preclude ACOs from successfully managing the health of their patients. To date, out-of-ACO care has not been well described, and this study characterizes out-of-ACO care and identifies patient-level predictors for receiving out-of-ACO care.

METHODS: We obtained Medicare claims data from Medicare FFS beneficiaries who were both prospectively assigned to the UCLA MSSP at the beginning of 2013 and retrospectively confirmed to be in the ACO at the end of 2013. Beneficiaries agreed to share data with the ACO. The UCLA IRB reviewed and approved this study. All Medicare Parts A and B services delivered inside and outside of the ACO in 2013 were included in the study. We allowed a 9-month claim runoff period to account for lag in claims processing. Health care expenditures were quantified for each patient using Medicare paid amounts, as this is the basis for determining shared savings. Expenditures for services with start and through dates in 2013 were included in their entirety. Expenditures for services that were partially provided in 2013 (e.g., hospitalizations beginning in 2012 and ending in 2013) were pro-rated. In-ACO services were defined as services attributed to a billing provider with an NPI number registered with the UCLA MSSP in 2013. All other services were considered out-of-ACO. We used two-part models of out-of-ACO expenditures consisting of a logit model of the probability of any out-of-ACO expenditures and a zero-truncated negative binomial model of the level of out-of-ACO expenditures among the conditional subsample of those with any out-of-ACO care.

RESULTS: On average, the 12,480 beneficiaries in the study population are 74.4 (SD=12.17) years of age and suffer from 3.61 (SD=2.45) medical conditions. The population is predominantly Caucasian (72.7 %), female (59.2 %), and lives 32.9 miles (SD=179.2) from the main ACO campus. Overall, 32.8 % of total expenditures were paid to providers outside of the ACO. Specifically, 25.6 % of inpatient expenditures and 36.9 % of

outpatient and ED expenditures were out-of-ACO payments. Out-of-ACO care was associated with having a greater number of medical comorbidities and being younger in age.

CONCLUSIONS: Out-of-ACO expenditures represent a significant portion of total expenditures for the UCLA MSSP population. Patients obtaining a greater proportion of their care outside of the ACO tend to be younger in age and suffering from a greater number of medical comorbidities. Future studies should examine how higher rates of out-of-ACO care affect total cost of care and health outcomes to determine whether the MSSP's open-network structure impedes its ability to improve value in care.

Characteristics of Study Population

Total Population; N(%)	12480	100.0 %
Age (yrs); mean (SD)	74.37	12.17
<65; N(%)	1465	11.74 %
65–74; N(%)	4770	38.22 %
75–84; N(%)	3841	30.78 %
85+; N(%)	2404	19.26 %
Male Sex; N(%)	5093	40.81 %
Race/Ethnicity		
White; N(%)	9073	72.70 %
Black; N(%)	1241	9.94 %
Latino; N(%)	483	3.87 %
Asian; N(%)	790	6.33 %
Other; N(%)	822	6.59 %
Dual-Eligible; N(%)	2492	19.97 %
Commercial Insurance; N(%)	334	2.68 %
Medicare ESRD; N(%)	137	1.10 %
Comorbidities; mean (SD)	3.61	2.45
Income (tens of thousands \$); mean (SD)	8.10	3.23
Distance (tens of miles); mean (SD)	3.29	17.92
Total Expenditure (\$); mean (SD)	13531.74	30538.78

UNDERSTANDING SUBSTANCE USE NEEDS AMONG HOSPITALIZED

ADULTS Honora Englander^{1, 3}; Christine Velez Klug²; Sarann Bielavitz¹; Benjamin Chan¹; Melissa B. Weimer^{1, 4}; Philip T. Korthuis¹. ¹Oregon Health & Science University, Portland, OR; ²Portland State University, Portland, OR; ³Central City Concern, Portland, OR; ⁴CODA, Portland, OR. (Tracking ID #2197943)

BACKGROUND: People with substance use disorders (SUD) have high rates of hospitalization, readmission, and complex chronic illness. Despite frequent contact with healthcare, many are not engaged in addiction treatment. Hospitalization may be a 'reachable moment' to initiate and coordinate addiction care. We aimed to determine the prevalence of substance use, readiness for change, and treatment preferences to understand patient perspectives to tailor an intervention to improve health outcomes.

METHODS: We surveyed hospitalized adults identified by nursing staff as having substance use disorder at a large academic medical center as part of a mixed-methods needs assessment. We included patients reporting high-risk alcohol or any drug use with the AUDIT-C and a single item drug screener, and enrolled consecutive adults screening positive. We assessed social and demographic factors, healthcare utilization, prevalence and severity of substance use, and experience and interest in treatment for those with moderate to high risk use on the ASSIST.

RESULTS: We enrolled 102 participants from September to December 2014 (Table 1). Participants reported high prevalence of moderate to severe substance use including alcohol (43.1 %), methamphetamine (31.4 %), and opioids (35.3 %). Medical conditions associated with SUD were common, including osteomyelitis (12.5 %), endocarditis (6.25 %), cirrhosis (19.6 %), and chronic pain (32.4 %). 55.6% of alcohol users and 61.6 % of illicit drug users reported interest in cutting back or quitting. Participants not already engaged in addiction treatment expressed high interest in medication-assisted treatment (18.9 % of alcohol users; among opioid users, 22.7 % interest in methadone, 29 % in buprenorphine). Many reported interest in initiating medications during hospitalization (Table 2).

CONCLUSIONS: Our findings support that hospitalization may be a reachable moment and suggest patient interest in integrated addiction care in the inpatient environment. Interventions to improve care might include initiation of medication-assisted therapies during hospitalization and improved linkages to residential and office-based addiction care upon discharge.

Participant Characteristics

		% (n)
Gender	Male	73.5 (75)
	Female	25.5 (26)
	Transgender	1.0 (1)
Demographics	Married	20.6 (21)
	White	80.4 (82)
	Some/ completed college	52.9 (54)
	Homeless	44.1 (45)
Healthcare experience	Have usual source of outpatient care	80.4 (82)
	ED visit in last 6 months.	64.7 (66)
	Hospitalized in last 6 months.	56.9 (58)
Health Conditions*	Endocarditis	6.25 (6)
	Osteomyelitis	12.5 (12)
	Abscess	21.9 (21)
	Heart failure	13.5 (13)
	Cirrhosis	7.3 (7)
	HIV	4.2 (4)
	Hepatitis C	25.0 (24)
	Diabetes	13.5 (13)
	Depression	27.1 (26)
	Anxiety	20.1 (20)
	Chronic pain	15.6 (15)
	Tobacco	77.5 (79)
Moderate-Severe Substance Use	Alcohol	43.1 (44)
	Cannabis	43.1 (44)
	Cocaine	15.7 (16)
	Amphetamines	31.4 (32)
	Inhalants	2.0 (2)
	Sedatives	13.7 (14)
	Hallucinogens	2.0 (2)
Polysubstance (multiple mod. to severe substances)	Opioids	35.3 (36)
	Opioids+stimulants+alcohol	5.9 (6)
	Opioids+stimulants+no other drugs	9.8 (10)
	Opioids+alcohol+no other drugs	1.0 (1)

* Electronic medical record diagnosis data only available for 98 of 102 participants

Readiness to change and treatment preferences

		% (n)
Interest in Cutting Back or Quitting	Among Alcohol Users	
	Do not want to quit	44.4 (28/63)
	Want to cut back	23.8 (15/63)
Among Drug Users	Want to quit	31.7 (20/63)
	Do not want to quit	38.4 (28/73)
	Want to cut back	21.9 (16/73)
Medication-Assisted Treatment (MAT) preferences	Want to quit	39.7 (29/73)
	Interested in receiving medication	18.9 (7/37)
	Interest in starting medication treatment while in the hospital	18.9 (7/37)
Moderate-severe alcohol users not on MAT	Interested in receiving methadone	18.1 (4/22)
	Interest in starting while in the hospital	22.7 (5/22)
Moderate-severe opioid users not on methadone	Interested in receiving buprenorphine	32.3 (10/31)
	Interest in starting while in the hospital	29.0 (9/31)

UNMATCHED MEDICAL GRADUATES AND PRIMARY CARE WORK-

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BACKGROUND: According to 2014 NRMP 13255 eligible medical graduates didn't match in to a residency program. Physicians who trained in medical schools outside of US and Canada represent 71 % of this group, defined as international medical graduates (IMGs). Nearly 40 % of IMG physicians are US citizens. IMGs play a vital role in the US health care system. they represent 26 % (or 263,473) of all practicing physicians in the US. IMGs are more likely to practice in primary care specialties facing physician shortages in underserved areas add to the diversity in workforce. According to ambulatory care survey they tend to cater for medicare and medicaid beneficiaries than US graduates. Approximately 50 % of all eligible IMGs match in to residency programs each year. Currently, the limiting factor in residency availability is the GME slot availability. With the implementation of new health care reforms, demand for physicians increase dramatically, including

a need for more than 40000 physicians in primary care. It is timely to understand the characteristics of medical graduates waiting for residency. Recent COGME report suggests exploring new ways to create outpatient residency positions.

METHODS: In August 2014 we conducted an exploratory cross sectional survey to examine the level of interest among ECFMG certified IMGs. Survey invitations (1468) were emailed to IMGs on AMA Masterfile using Qualtrics Survey Software. Individuals who are ECFMG certified medical graduates from medical schools outside of the US or Canada who were not accepted to a residency program in 2014 were eligible to respond to the survey. This study was approved by the Johns Hopkins Medicine Institutional Review Board.

RESULTS: Out of 1468 sample, 219 (15 %) responded representing 57 countries. Forty-nine percent were females. The majority was 31–40 years old (49 %) and married (72 %). The majority was either US citizens or permanent residents (78 %), and 17 % were visa holders. Most of them were graduated within last 6 years. Seventy-three percent had some US experience, including 42 % externship, 19 % electives, and 16 % core rotations. Thirty-one percent of respondents are employed in some medical profession, 47 % are either unemployed or working in a non-medical field. Reported current occupation varies from physicians in other countries, nurses, clinical assistants, etc. The majority support family of 1 or more financially (>64 %). Most respondents are interested in primary care disciplines (general practice [33 %] and Internal medicine [22 %] psychiatry [10 %] and pediatrics [8 %]). Sixty-four percent reported that they are interested in hospital-based practice and 30 % are interested in outpatient practice. Most respondents are interested in practicing in underserved inner city (88 %) and rural areas (87 %). Majority reported that they are determined to get in to residency. Eighty-six and 74 % reported scores between 180 to 220 for USMLE Step 1 and Step 2 respectively. Sixty-five percent reported passing Step 2 CS in the first attempt.

CONCLUSIONS: The majority of IMGs who are waiting to match in to a residency indicated interest in primary care discipline. This group is otherwise qualified but lacks required residency experience to practice as physicians. Our survey results confirm that the unmatched residency candidates are available to contribute their skills to primary care when given the opportunity. General Internal Medicine community has an opportunity to explore ways to integrate this group of skilled and motivated medical graduates in their workforce planning.

USE OF A BLOOD PRESSURE TRACKING TOOL IN AN ELECTRONIC MEDICAL RECORD Molly B. Conroy¹; Manisha Jhamb¹; Jonathan Yabes¹; Glenn M. Updike²; Gary Fischer¹. ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2198285)

BACKGROUND: Outpatient (ambulatory) blood pressure (BP) measures have been shown to be highly predictive of cardiovascular mortality. Despite this, ambulatory BP data is often not available to providers making decisions about hypertension management. Electronic medical records (EMRs) offer a potential avenue for patients to enter ambulatory BP data into a location where it could be readily viewed by providers.

METHODS: The University of Pittsburgh Medical Center (UPMC) uses the Epic EMR and has a patient portal of the EMR (MyUPMC) that offers a flowsheet for tracking ambulatory BP measurements (BP flowsheet). The BP flowsheet has been available since 2003 and can be ordered by a provider or requested by a patient. Patients enter systolic and diastolic BP (SBP, DBP) and heart rate data into the BP flowsheet, and new data is routed to their provider. We abstracted data from the EMR to determine how many current MyUPMC users with a diagnosis of hypertension (ICD-9 code 401.XX) had entered any BP flowsheet data in from 9/1/2013-9/30/2014. In addition, we abstracted data about patient demographic characteristics, comorbidities, most recent BP measured in clinic, number of BP medications, and number of provider visits in past year. We classified most recent SBP as poorly controlled if it was >140 mmHg. We examined descriptive statistics and used t-tests and Chi-squared tests to determine if there was a difference in demographic or clinical characteristics between MyUPMC patients without and with BP flowsheet data in the past calendar year. For those patients with BP flowsheet data, we further examined whether number of flowsheet entries was associated with most recent BP measured in clinic using Spearman correlation.

RESULTS: We analyzed data from 65,661 patients with an active MyUPMC account and a diagnosis of hypertension. Of these, only 588 (0.9 %) had BP flowsheet data in the past calendar year. MyUPMC users with flowsheet data were more likely to be younger (54.2 vs. 58.7 years; $p<0.001$) and male (48.5 vs. 42.5 %; $p=0.004$), with no difference seen in race, when compared to MyUPMC users without flowsheet data. Users with flowsheet data were also

more likely to never have smoked (59.2 vs. 53.8 %; $p=0.03$), have a lower BMI (31.5 vs. 32.9; $p=0.001$), and be free of diabetes and coronary heart disease (insert numbers). However, users with flowsheet data had higher mean SBP at last clinic visit (133 vs 130; $p<0.001$), higher frequency of poorly controlled SBP (24.7 vs. 20.1 %; $p=0.006$), a higher number of BP medications (1.6 vs. 1.3; $p<0.001$), and higher number of provider visits in past year (3.4 vs. 2.9; $p<0.001$) when compared to users without flowsheet data. Among users with flowsheet data, the median number of flowsheet entries in the past year was 7 (IQR 2, 17), with a range from 1 to 292. Number of flowsheet entries was not associated with SBP measured at most recent clinic visit ($r=0.05$; $p=0.24$).

CONCLUSIONS: Only a very small number of patients who were eligible to use the BP flowsheet did so, and users tended to be younger and have fewer comorbidities. Despite that, office SBP was higher in users, which may reflect the type of patient whose provider selected this type of monitoring (i.e., patients with higher BP), a lack of feedback given to those entering flowsheet data, or a poor association between ambulatory and clinic readings. Further work should be done to study uptake of BP flowsheet use and feedback provided to patients who do enter data.

USE OF COLORECTAL CANCER SCREENING SERVICES IN THE ERA OF THE AFFORDABLE CARE ACT Ilana B. Richman^{2, 1}; Steven Asch^{2, 3}; Douglas K. Owens^{2, 1}. ¹Stanford University, Stanford, CA; ²Palo Alto Veterans Affairs Hospital, Stanford, CA; ³Stanford Medical School, Stanford, CA. (Tracking ID #2194708)

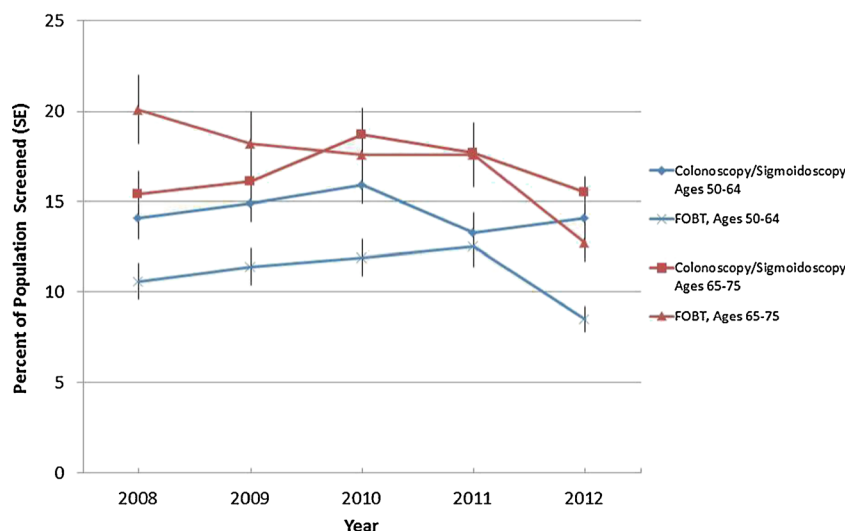
BACKGROUND: Despite the established benefits of colorectal cancer screening, only about 65 % of the eligible population in the United States is adherent to current screening recommendations. In 2010, the Patient Protection and Affordable Care Act (ACA) eliminated out-of-pocket costs for evidence based preventive care including colorectal cancer screening. Whether this change in policy has increased uptake of these preventive services is not known.

METHODS: We used the 2008–2012 Medical Expenditure Panel Survey (MEPS) to ascertain rates of self-reported colorectal cancer screening using colonoscopy, sigmoidoscopy, and fecal occult blood testing (FOBT). Our study population included adults ages 50–64 with private insurance and adults 65–75 with Medicare, populations covered by the cost-sharing provision of the ACA and for whom screening is recommended by the United States Preventive Services Task Force. The main analytic variable indicated time pre- and post-ACA mandate. Logistic regression covariates included age, sex, income, and sampling weights. To account for non-age specific secular trends, we also performed a difference-in-difference analysis, comparing a group unaffected by the ACA and for whom these services are not recommended—privately insured adults ages 40–49—to older privately insured patients for whom the procedures are recommended.

RESULTS: Our study included 11,545 privately insured adults ages 50–64 and 6696 adults ages 65–75 with Medicare. Annual rates of colonoscopy and sigmoidoscopy ranged from 13–16 % per year among privately insured individuals and 15–19 % among Medicare beneficiaries. FOBT rates ranged from 13–20 % per year among those with Medicare and 9–13 % per year among the privately insured (Figure). Among adults ages 50–64, those in the post-ACA period were not more likely to have received a colonoscopy or sigmoidoscopy compared to those in the pre-ACA period (OR 0.90, 95 % CI 0.79–1.20, $p=0.10$). Use of FOBT was slightly lower post ACA (OR 0.83, 95 % CI 0.69–0.99, $p=0.044$). Among adults with Medicare, those in the post-ACA period were not more likely to have received a colonoscopy or sigmoidoscopy (OR 0.92, 95 % CI 0.78–1.09, $p=0.34$) and were less likely to have received FOBT (OR 0.72, 95 % CI 0.58–0.88, $p=0.002$). Our difference-in-differences analysis compared rates of colonoscopy or sigmoidoscopy for privately insured adults ages 40–49 ($n=8176$) to privately insured adults ages 50–64. The interaction term, representing the difference-in-differences estimator, was not significant (coefficient for interaction term -0.01 , 95 % CI -0.32 – 0.30 , $p=0.95$).

CONCLUSIONS: Elimination of cost-sharing for colorectal cancer screening has not resulted in increased use of these preventive services in the post-ACA period. There are a number of possible reasons for this: cost sharing may not be a substantial barrier to receipt of services, insurers may not be fully compliant with the law, patients may be unaware of this new benefit, and hidden costs for biopsies and follow up studies may still discourage use. Further analysis over the next several years will reveal whether rates of utilization remain flat or whether the elimination of cost sharing eventually promotes use of clinical preventive services.

Annual Frequency of Colorectal Cancer Screening by Age Group



USE OF HISTORICAL DATA TO VALIDATE SIMULATION MODELING IN THE CREATION OF A GEOGRAPHICALLY-FOCUSED ADMITTING SYSTEM Heather Masters¹; Vimal Mishra¹; Joseph Heim²; Richard Storch²; Shin-Ping Tu¹. ¹Virginia Commonwealth University, Richmond, VA; ²University of Washington, Seattle, WA. (Tracking ID #2189137)

BACKGROUND: It has been nearly a decade since the joint paper between the National Academy of Engineering and the Institute of Medicine recommended the application of systems engineering approaches in order to deliver health care that is efficient, effective, and patient-centered, yet large academic medical centers remain highly complex systems that are rife with inefficiencies. One area that has been shown to contribute to inefficient, ineffective patient care and poor patient and provider satisfaction is the geographic dispersion of traditional inpatient care teams. Simulation modeling has been used successfully to identify flow issues in the emergency department setting and has the potential to improve geographic assignment of admitted patients in the setting of variables such as high occupancy and the need for appropriate workload balance. In order to do this, the simulation technique must first be validated using historical distribution data.

METHODS: Admissions data for the Internal Medicine housestaff teams for calendar year 2013, including time/date of admission, initial bed assignment and discharge time/date, was extracted from the Electronic Health Records (EHR). Length of stay was calculated by the differential between admission and discharge times. Utilization of team patient load capacity for EHR data was calculated using Markovian queuing theory. Applying systems engineering techniques with SIMIO (simulation software), a current state model was developed to represent housestaff team admission rate and volume, bed location distribution and any queuing processes. For validation purposes, 50 iterations of the current state model were performed to decrease the variance of: 1) the mean of the number of patients in each unit, 2) the mean team census; and 3) the percentage utilization of each team's patient load capacity. The validated estimate was compared with the 12 month EHR data from 2013. A linear regression model and goodness of fit test was performed between the validated simulation data and EHR data.

RESULTS: A total of 3953 patients were admitted to the Internal Medicine housestaff teams. These patients were distributed across 17 nursing units throughout the hospital. The mean number of patients admitted to different nursing units was estimated from the simulation model then compared to the EHR data from 2013 respectively: #1 (29.88, 30.00), #2 (19.58, 19.00), #3 (128.10, 129.00), #4 (167.22, 172.00), #5 (91.88, 91.00), #6 (122.58, 121.00), #7 (244.06, 246.00), #8 (414.78, 417.00), #9 (2.10, 2.00), #10 (144.70, 149.00), #11 (56.10, 54.00), #12 (1176.52, 1172.00), #13 (1.20, 1.00), #14 (84.44, 86.00), #15 (116.54, 117.00), #16 (485.7, 486.00), #17 (667.62, 661.00). None were statistically significant ($p > 0.05$). Average team census based on EHR data was noted to be 12.00 compared to the validated simulation model of 11.55. EHR derived percentage utilization

of each team's patient load capacity was 72.00 % compared to the validated simulation model of 72.20 %. Goodness of fit for the validated model as compared to the EHR data resulted in a coefficient of determination of $r^2 = 0.99$, signifying the validated simulation model is similar to the EHR data from 2013 and therefore reliable.

CONCLUSIONS: Systems engineering principles such as simulation provide scientific and data driven methods to model highly complex processes, an example of which is the assignment of patients to hospital beds and care teams in a large academic medical center. Once validated by historical data to accurately reflect a particular health system's constraints, simulated distribution models can be developed and modified based on current state variables such as hospital occupancy or changes in provider-specific characteristics such as workload, allowing for targeted interventions that decrease waste both in time and effort over traditional methods of operational improvement.

USE OF PHYSICIAN ORDERS FOR LIFE SUSTAINING TREATMENT AMONG CALIFORNIA NURSING HOME RESIDENTS: SUCCESSFUL BROAD DISSEMINATION BUT MISSING SOME WHO NEED IT MOST Lee A. Jennings³; David Zingmond²; Rachel Louie²; Judy Thomas⁴; Kate O'Malley¹; Neil Wenger². ¹California HealthCare Foundation, Oakland, CA; ²UCLA, Los Angeles, CA; ³Division of Geriatrics, UCLA, Los Angeles, CA; ⁴Coalition for Compassionate Care of California, Sacramento, CA. (Tracking ID #2195735)

BACKGROUND: Physician Orders for Life-Sustaining Treatment (POLST) is a tool that facilitates elicitation and continuity of life-sustaining care preferences across care settings. POLST was implemented in California in 2009 using a novel dissemination strategy, which included the addition of a section on POLST use (Section S) to the California Minimum Data Set (MDS) in 2011. This allowed the first statewide evaluation of the use of POLST among nursing home residents. How well POLST was disseminated across a large, racially diverse population of nursing home residents is not known and has implications for end of life care for this vulnerable population. We examined the uptake of POLST across California nursing homes in 2011; variation and problematic use at the nursing home level; and the relationship of POLST completion with patient characteristics.

METHODS: We evaluated all California nursing home residents in 2011 using the MDS. We computed the proportion of residents with a valid POLST (containing an order concerning resuscitation status and both resident/proxy and physician signatures); change in POLST completion during 2011; the proportion of residents with unsigned POLST forms; and valid POLST completion and unsigned forms at the nursing home level. We also examined the relationship of POLST completion and resident length of stay, age, gender, race/ethnicity, and cognitive and functional status using multivariate logistic regression adjusting for nursing home as a random effect. The model was repeated on the sample stratified by long and short length of stay.

RESULTS: Of 296,276 people with a California nursing home stay in 2011, 98 % completed the MDS section concerning POLST use (Section S). Over the course of 2011, valid POLST completion increased from 33 to 49 % of nursing home residents. Resident mean age was 78 years, 61 % were female, and 33 % were racial or ethnic minorities. One third of residents were long-stay (≥ 100 days in nursing home), 30 % had extensive or total dependence in activities of daily living, and 34 % were severely cognitively impaired. In adjusted multivariate models, long stay residents were more likely than short stay residents to have a valid POLST [OR=2.36 (95 % CI 2.30, 2.42)]. Severely cognitive impaired residents were less likely than unimpaired to have a valid POLST, and this difference was more pronounced for long-stay residents [OR=0.76 (95 % CI 0.72, 0.80) vs. OR=0.95 (95 % CI 0.92, 0.98)]. However, among long-stay residents greater functional impairment was associated with an increased odds of POLST completion [OR=1.10 (95 % CI 1.19, 1.27)], while among short stay residents severe functional impairment decreased odds of POLST completion [OR=0.94 (95 % CI 0.89, 0.99)]. There was no difference in POLST completion among White non-Hispanic, Black, and Hispanic residents. Among nursing homes in California with greater than 20 residents, 40 % of facilities had ≥ 80 % of long-stay residents with a valid POLST, while in 20 % of facilities ($N=221$) ≤ 10 % of long-stay residents completed a valid POLST. Twenty-one percent of all POLSTs containing a resuscitation preference lacked a signature, and in 10 nursing homes ≥ 50 % of POLSTs containing resuscitation orders had at least one signature missing. One percent of all residents had a blank POLST containing a physician or resident/proxy signature.

CONCLUSIONS: Statewide nursing home data show wide and appropriate use of POLST in California 3 years into implementation of a novel dissemination strategy. The similarity in POLST use across race/ethnicity demonstrates uptake within racially diverse communities. The inverse relationship between severe cognitive impairment and POLST use conflicts with clinical expectations and suggests deficits in end of life care planning for the most vulnerable nursing home residents. This merits further investigation and intervention. Use of POLST rapidly increased during 2011, although a significant minority of nursing homes were slow to adopt POLST. MDS data identify nursing homes that may benefit from POLST quality improvement interventions. Lastly, POLSTs lacking signatures suggest a need for a POLST registry that would perform quality assessment on collected documents to ensure POLST forms are valid.

USE OF SAFETY NET CLINICS FOR PRIMARY CARE AMONG INSURED INDIVIDUALS IN THE UNITED STATES: NAMCS 2006–2010 Oanh K. Nguyen; Anil N. Makam; Ethan Halm. UT Southwestern Medical Center, Dallas, TX. (Tracking ID #2196419)

BACKGROUND: Individuals with health insurance coverage are thought to be less reliant on safety net settings for care. However, it is unknown the extent to which individuals with insurance coverage nonetheless use safety net settings for regular primary care. Thus, we sought to describe the prevalence and predictors of safety net use for primary care among insured adults, and clinical characteristics of this population.

METHODS: Cross-sectional analysis of all primary care visits by adults (≥ 18 years) in the National Ambulatory Medical Care Survey (NAMCS) from 2006–2010, a probability sample of outpatient visits in the U.S. Our primary outcome was use of a safety net clinic, defined as community health centers and non-federal government clinics. Individuals were considered insured if they had private insurance or Medicare. Analyses were weighted to reflect national estimates. Predictors of safety net use were estimated from logistic regression models adjusted for demographic characteristics.

RESULTS: Of a total of 37,155 primary care visits among insured adults, 4156 visits (2.0 % of weighted visits) occurred in safety net clinics. These constituted over 1 in 3 (35.0 %) of all primary care safety net clinic visits, representing an estimated 6,642,000 visits per year. The strongest predictors of safety net use among insured individuals were being from a high-poverty neighborhood (AOR 8.42, 95 % CI 4.09–17.31), being dually eligible for Medicare and Medicaid (AOR 4.59, 95 % CI 2.74–7.70), and being black (AOR 2.28, 95 % CI 1.28–4.07) or Hispanic (AOR 2.28, 95 % CI 1.38–3.79). Compared to non-safety net counterparts, insured adults in the safety net had a higher prevalence of diabetes (23.5 % vs 15.0 %, $p<0.001$), hypertension (49.4 % vs 36.0 %, $p<0.001$), multimorbidity (≥ 2 chronic conditions; 53.5 % vs 40.9 %, $p<0.001$) and polypharmacy (≥ 4 medications; 48.8 % vs 34.0 %, $p<0.001$). Nearly one-third (28.9 %) of Medicare beneficiaries in the safety net were dually eligible,

compared to only 6.8 % of Medicare beneficiaries in non-safety net clinics ($p<0.001$).

CONCLUSIONS: Safety net clinics are important primary care delivery sites for insured minority and low-income populations with a high burden of chronic illness. The critical role of safety net clinics in care delivery is likely to persist despite expanded Medicaid and insurance coverage under the Affordable Care Act.

USING ELECTRONIC HEALTH SYSTEMS DATA TO INVESTIGATE THE GEOGRAPHIC VARIATION IN DEPRESSION PREVALENCE ACROSS DENVER, COLORADO Carlos Irwin Oronce¹; Arne L. Beck²; Glenn K. Goodrich³; Michael J. Durfee¹; Sarah Madrid³; Suzanne Dirksen¹; Susan L. Moore¹; Arthur Davidson¹; John F. Steiner³; Edward P. Havranek^{2,4}. ¹Denver Health, Denver, CO; ²Denver Health Medical Center, Denver, CO; ³Kaiser Permanente Colorado, Denver, CO; ⁴University of Colorado School of Medicine, Denver, CO. (Tracking ID #2196003)

BACKGROUND: The growth and availability of data from electronic medical records (EMR) has made it easier to conduct public health surveillance, build disease registries, and integrate community-level data for the purposes of population health management. Furthermore, geographic information systems (GIS) software has facilitated nuanced population health assessment by allowing health systems or public health agencies to identify “hot-spots” of common diseases, behaviors or outcomes in communities served and to examine their relationships with social determinants of health. We provide a case example that draws on data from two health systems in Denver, Colorado to identify neighborhoods where depression is highly prevalent and to examine the socioeconomic characteristics of these communities.

METHODS: De-identified data of patients 18 years and older were extracted from the EMR of an integrated health maintenance organization (Kaiser Permanente—Colorado) and an integrated safety net health care system (Denver Health). Patient addresses were geocoded to Denver census tracts and cases of depression identified by ICD-9 code (296.2x, 296.3x, 296.82, 298.0, 300.4, 301.12, 309.0, 309.1, 309.28, 311). Crude prevalence rates were calculated for each census tract (CT). Demographics, total population, poverty rates, and unemployment rates at the census tract-level were derived from the 2010 American Community Survey (ACS) and crime rates came from publicly available data from Denver County. To identify “hot spots”, three GeoDa software techniques were implemented: Empirical Bayes (EB) smoothed rates, Local Moran’s I test, and Getis-Ord Gi* test. Those CT with EB-smoothed prevalence rates above the 90th percentile were identified as potential “hot spots” for depression. The Local Moran’s I and Gi* are spatial association tests that convert rates to z-scores and determine if significant differences exist on the basis of geography and neighboring rates. For these methods, significance was established at $p<0.01$. CT identified by all three methods were considered true “hot spots” where depression was highly prevalent and clustered.

RESULTS: One hundred seventy-four thousand seven hundred thirty patients, representing 35.4 % of the Denver population, were geocoded to 144 census tracts. Using the ACS population as the denominator, the rate of individuals represented for each CT ranged from 10.9 to 58.9 %. The mean crude prevalence of depression by CT was 103.1 cases per 1000 residents. Neighborhood rates varied from 0 to 169.9 cases per 1000 residents. EB-smoothing did not alter which 14 CT were identified as potential “hot spots” (Fig. 1). Local Moran’s I analysis revealed a depression cluster of 6 CT. Gi* analysis revealed 7 high-risk CT in the same area. Four CT were identified as “hot spots” by all three methods. Crude prevalence rates for these tracts were: 143.3, 131.3, 129.9, and 127.4 cases per 1000 residents. All four neighborhoods were in the top quartile for poverty rate and percent of residents identifying as Hispanic. Two neighborhoods were in both the top quartile for unemployment rate as well as top quartile for percent of residents identifying as black. All neighborhoods were above the median for crime rate, with two in the top quartile.

CONCLUSIONS: Three separate methods for geographic analysis of depression epidemiology revealed four neighborhoods where depression cases were concentrated. All neighborhoods identified as “hot-spots” were notably characterized as high poverty with large Hispanic populations. Identifying “hot-spots” can help public health officials and urban planners determine where resources should be invested. These results should be presented to community members to understand their perceptions and help identify ways to inform future interventions.

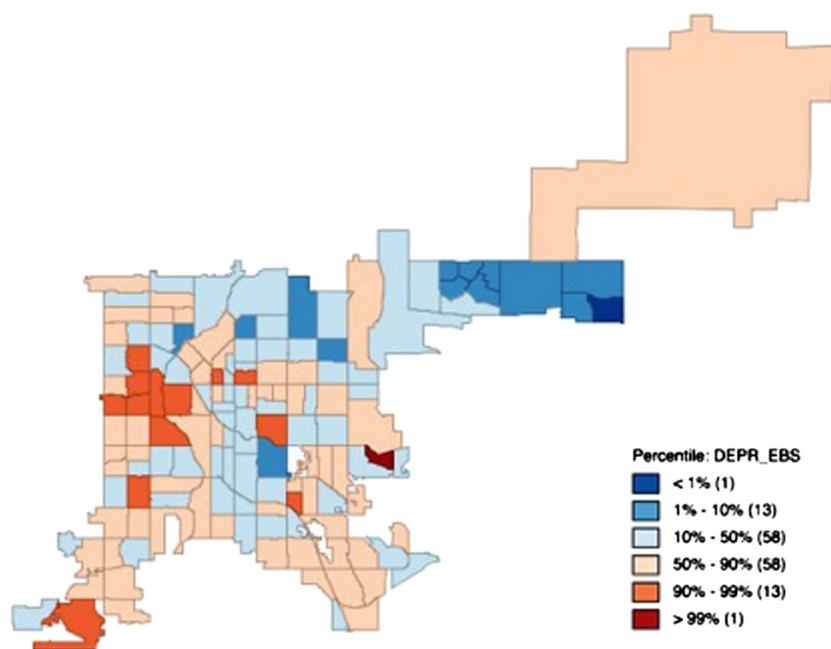


Fig. 1. Percentiles of EB-smoothed depression prevalence rates in Denver, CO

USING GEOCODING TO DEVELOP AN INTERVENTION TO IMPROVE DIABETES OUTCOMES AT AN URBAN SAFETY-NET HOSPITAL

Karen E. Lasser¹; Lisa Quintiliani¹; Ve Truong¹; Pamela D. Waterman²; Julia Matthews¹; Julianne McNamara¹; Nancy Krieger². ¹Boston Medical Center, Boston, MA; ²Harvard School of Public Health, Boston, MA. (Tracking ID #2187042)

BACKGROUND: Effectively addressing diabetes-related health disparities requires better understanding of both the spatial and social distribution of the disease. Geographic information systems methodology can assist primary care practices, providing guidance for disease management programs. Approximately 20 % of 7470 diabetics in the general internal medicine practice at Boston Medical Center, an urban safety-net hospital, have poorly controlled diabetes, with a hemoglobin A1C >9. In order to inform a possible community-based intervention that integrates social and environmental contexts, we sought to identify geographic areas with a high number of patients with poorly controlled diabetes.

METHODS: Using the geographic information systems software ArcGIS, we geocoded (to street address) records on general internal medicine patients with poorly controlled diabetes (hemoglobin A1C >9) who had a primary care provider visit in the past 24 months. We identified and mapped the census tracts containing at least 20 patients with poorly controlled diabetes, and identified both community assets (green space) and deficits (indirect bus lines to reach the hospital, and crime using www.spotcrime.com). We used chi square tests to compare groups.

RESULTS: Among the 1494 patients with poorly controlled diabetes, 97 % ($n=1454$) had an address that could be geocoded. Of these 1454 patients, 23 % resided within 13 Boston-area census tracts that each contained at least 20 patients with poorly controlled diabetes. Sociodemographic characteristics of the geocoded patients were as follows: mean age 56 (standard deviation 12.8); 53.2 % women; 61.1 % black, 9.5 % white, 18.5 % Hispanic, and 10.9 % of other race. 67.1 % of patients spoke English, 14.4 % Haitian Creole, 11.8 % Spanish, and 6.7 % other languages. Relative to the 1114 patients who lived in the 348 census tracts with <20 patients with uncontrolled diabetes, the 340 who lived in the 13 census tracts with 20 or more such patients were of similar age and gender, but were more likely to speak English (71.5 % vs. 65.7 %; $p=0.05$) and less likely to speak Haitian Creole (11.2 % vs. 15.4 %; $p=0.05$). Patients in the 13 census tracts were more likely to be black (70.6 vs. 58.3 %; $p<0.0001$) or Hispanic (22.3 % vs. 17.3 %; $p=0.04$) and less likely to be white (2.1 vs. 11.8 %, $p<0.0001$). With regard to census tract characteristics, among the 13 with 20 or more patients with uncontrolled diabetes, the percent of persons below the federal poverty line ranged from 15 to 45.0 %. All 13 census tracts contained green space or abutted areas of green space. Twelve of the 13 census tracts had no direct bus line to the safety-net hospital-based primary care practice, and the

number of crimes in each census tract ranged from 4 to 16 in the past week (mean 9.9; standard deviation 3.9).

CONCLUSIONS: Nearly one-fourth of patients with poorly controlled diabetes who receive primary care at a large safety-net hospital reside in census tracts with a high number of other patients with poorly controlled diabetes. In order to reduce racial disparities in diabetes control, the health system might engage and target these census tracts for community-based outreach. Further qualitative research with patients residing in the 13 census tracts with the most poorly controlled diabetics is planned, to explore community-level barriers to better diabetes control.

USING SIMULATION TO IMPROVE HOUSE STAFF ACLS SKILLS Michael Lindeke³; Jennifer Camahan¹; Kathlyn Fletcher². ¹Indiana University Center for Aging Research/Regenstrief Institute, Indianapolis, IN; ²Medical College of Wisconsin/Milwaukee VAMC, Tbd, AL; ³Medical College of Wisconsin, Milwaukee, WI. (Tracking ID #2200254)

BACKGROUND: House staff leading code teams are often observed to lack leadership skills, confidence, and Advanced Cardiac Life Support (ACLS) knowledge. Our objective was to determine the efficacy of a simulation-based ACLS curriculum to improve the preparation of house staff to lead teams while managing cardiac arrest.

METHODS: This quality improvement project occurred at a VA affiliated with an academic internal medicine residency program. The participants were internal medicine house staff who rotated at the VA during the intervention period (March-December 2014). We performed a longitudinal pre/post analysis to assess the ACLS knowledge, confidence, and leadership skills of residents who have completed a simulation-based ACLS curriculum. The intervention consisted of a didactic lecture focused on ACLS knowledge and practical aspects of running a code (such as how to use the defibrillator). We also conducted an hour-long simulation exercise that included two simulated code scenarios. These simulation exercises were conducted in small groups of house staff (4-5 at a time). The chief resident also led a debriefing after each simulation. We evaluated the effectiveness of the curriculum in a few different ways. First, we distributed a quiz to all house staff in the program that assessed their initial experience, knowledge, and confidence related to code situations. Second, during each of the two simulations, the performance of the house staff as a team was graded by a chief resident, based on a rubric of pre-determined ACLS and Crisis Resource Management (CRM) tasks. Third, the house staff assessed their confidence before and after participating in the simulation (this assessment was added later). Lastly, a post-simulation questionnaire was completed by all participating residents assessing the value of the simulation training.

RESULTS: To date, 51 house staff have participated in the simulation exercise. House staff who had not participated in any simulation based training rated their comfort leading a code an average of 2.44/5, with 5 being most comfortable (STD=.95, $N=77$). In a pre/post simulation comparison, house staff who completed the training showed a higher level of confidence leading codes after completing the simulation session (3.33/5 vs. 4.00/5; $P=0.15$, $N=16$). House staff who completed simulation based ACLS training also showed a significantly higher confidence in their knowledge of ACLS algorithms (4.33/5 vs. 3.96/5; $P=.034$). Improvement in resident ACLS and CRM performance, as graded by a chief resident, improved from the first to second simulations (7.5/18 vs. 11.4/18; $P=.084$). In the post simulation survey, 100 % of house staff agreed or strongly agreed that their leadership skills and level of ACLS knowledge improved by completing the training ($N=51$). Lastly, 100 % of residents who completed the training agreed it was worth taking time out of their work day to complete ($N=51$).

CONCLUSIONS: Our results suggest that a simulation based ACLS intervention may increase house staff confidence, knowledge, and leadership when leading a code team. This may improve outcomes as well as team dynamics in code situations. Further investigation into the translation of simulation training into the actual patient care setting should be investigated.

UTILIZATION OF A MENTAL HEALTH COLLABORATIVE CARE MODEL BY PATIENTS WITH LIMITED ENGLISH PROFICIENCY IN A PRIMARY CARE SETTING Jane Njeru; Ramona S. DeJesus; Jennifer St. Sauver; Debra Jacobson; Patrick Wilson; lila rutten; Mark L. Wieland. Mayo Clinic, Rochester, MN. (Tracking ID #2199243)

BACKGROUND: Immigrants to the United States with limited English proficiency have a higher prevalence of depression compared to the general population. They are also less likely to receive necessary mental health services and treatment, and even when received, these services often do not meet the accepted standards of care. Collaborative care management (CCM) for depression has been shown to be an effective model in achieving treatment goals among a wide range of patient populations, including patients with limited English proficiency. The Depression Improvement across Minnesota, Offering a New Direction (DIAMOND) a statewide program, is one such CCM that has been effective in improving outcomes in depression treatment in primary care. CCM utilization among patients with limited English proficiency has not been previously studied. Therefore, the purpose of this study was to assess utilization of a mental health CCM among patients with limited English proficiency within a patient centered medical home.

METHODS: Within a large primary care network in Minnesota, we compared the enrollment rates of adult patients into the DIAMOND program by interpreter status. We included all 7561 patients who had a provider generated diagnosis of major depression or dysthymia and a Patient Health Questionnaire-9 (PHQ-9) score of 10 or greater. We used need for interpreter services as a proxy for limited English proficiency.

RESULTS: Patients who required interpreters were older (median age in years 47.4 vs 40.2; $p=0.001$) and had a higher mean PHQ-9 score at baseline (median score 16 vs 15 $p=0.0347$) when compared to patients who did not require interpreters. Only 18.2 % of eligible patients who required interpreters were enrolled into the DIAMOND program, compared to 47.2 % of patients who did not require interpreters ($p<0.0001$). Even after adjustment for the differences in age, gender and PHQ-9 scores, patients who required interpreters were significantly less likely to be enrolled in the DIAMOND program, with adjusted OR (95 % CI) of 0.31 (0.17, 0.57).

CONCLUSIONS: Patients with limited English proficiency were less likely to be enrolled into an effective CCM for the treatment of depression. Additional research is needed within primary care practices to better understand the mechanisms of this disparity, and to implement sociolinguistically tailored interventions that improve the utilization of this effective model among patients with limited English proficiency.

VACS-TLFB FOR ALCOHOL USE: A WEB BASED TIMELINE FOLLOWBACK APPLICATION - A HEALTH TECHNOLOGY ASSESSMENT FARAH KIDWAI-KHAN^{2, 5}; Kathleen A. McGinnis¹; Janet P. Tate⁴; Kendall Bryan⁵; Amy C. Justice³. ¹VA Pittsburgh Healthcare System, Pittsburgh, PA; ²YALE UNIVERSITY, Sleepy Hollow, NY; ³Yale University, West Haven, CT; ⁴Yale University SOM, West Haven, CT; ⁵VA Connecticut Healthcare Systems, West Haven, CT. (Tracking ID #2198915)

BACKGROUND: The Timeline Followback (TLFB) is a highly detailed calendar based method for collecting self-reported behaviors and is considered the gold standard for collecting data on alcohol consumption. Whether administered by an interviewer or done

directly by study participants, paper based calendar entry is cumbersome and requires subsequent data entry. We have developed a computerized tool to collect TLFB alcohol use information that can be self-completed at home or in a clinical setting.

METHODS: The Veterans Aging Cohort study (VACS) enrolls patients at nine geographic locations in the United States and uses a web-based survey to collect health and health-related information. Based on responses to lead-in questions on the survey, the application directs participants to the VACS-TLFB, a web based tool that collects daily use of alcohol. Visual controls allow users to drag and drop specific types of drinks onto the calendar and to specify date ranges for days on which the same types of drinks were consumed (on consecutive days or daily). The interface communicates directly with a relational database which stores respondent's data. First introduced in 2013, Phase 1 resulted in lower than expected completion rates, and user-interface inconsistencies were identified. In Phase 2, we improved the interface, usability, and data integrity of the web-based VACS-TLFB. We calculated the Phase 2 completion rate, and total number of drinks reported on the VACS-TLFB over a 28-day period. We also compared the total number of drinks reported on the VACS-TLFB to the total number of drinks over a 28-day period estimated from the first two questions of the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) using Spearman's correlation coefficient and corresponding p-value. Lastly we compared total number of drinks estimated from the AUDIT-C between those who did and did not complete the VACS-TLFB. The first two AUDIT-C questions are "How often do you have a drink containing alcohol?" (With choices of never, monthly or less, 2 to 4 times a month, 2 times a week or 4 or more times a week) and "How many drinks containing alcohol do you have on a typical day when you are drinking?" (With choices of 1 or 2, 3 or 4, 5 or 6, 7 to 9, 10 or more). Using these items, total number of drinks over a 28-day period was estimated using the median of each item's category options.

RESULTS: Of 237 subjects reporting drinking in the past 30 days on the web-based survey, 78 % (185) completed the alcohol portion of the VACS-TLFB. Median (IQR) total number of drinks reported over 28 days on the VACS-TLFB and web-based survey is 9.0 (3.6–20.8) and 10.5 (3.5–30), respectively. The correlation between VACS-TLFB and first two items of AUDIT-C total number of drinks was 0.67 ($p<.001$) which represents a strong association. Those who did not complete the VACS-TLFB reported a lower median (IQR) total number of drinks (4.5 (1.5–22.5)), based on the first two items of the AUDIT-C, than those who completed the VACS-TLFB, although the difference is not statistically significant ($p=.14$).

CONCLUSIONS: Phase 2 VACS-TLFB data are highly correlated with AUDIT-C responses on the web-based survey, providing validity to the self-administered VACS-TLFB. Using the web-based version of the VACS-TLFB is both a more efficient and more detailed method for data collection. This application may be useful to other clinicians and researchers looking for a more efficient mode for TLFB data collection.

VASCULAR SURGERY-HOSPITALIST COMANAGEMENT PROGRAM REDUCES EARLY READMISSIONS Matthew Shaines²; Calie Santana²; Peter Shamamian²; William Southern¹. ¹Montefiore, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2199215)

BACKGROUND: Hospitalist comanagement is a model of care in which a hospitalist and surgeon have shared responsibility and accountability for the care of hospitalized patients. The model has become increasingly popular and 85 % of hospitalist groups report having engaged in some form of comanagement. Although the comanagement model was created to improve throughput and quality of care on the surgical services, there are few empirical data to support its effectiveness in improving patient outcomes. It has been suggested, though, that the comanagement model will be most effective when medically complex patients are cared for. The effect of a hospitalist-surgical comanagement model of care on a vascular surgery service, which cares for a high volume of highly complex medical patients, is unknown. Additionally, hospitalists often do not rate their experience working on a comanagement service very highly. Our objective was to evaluate a vascular surgery-hospitalist comanagement service with respect to rate of readmissions, length of stay, and hospitalist satisfaction.

METHODS: We examined all patients admitted to the vascular surgery service at an urban academic medical center in the year before (10/12-9/13) vs. year after (11/13-10/14) the implementation of a comanagement model. During the comanagement period a full-time hospitalist was integrated into the vascular service and rounded 7 days a week. All patients admitted to the vascular service were eligible for comanagement. Admissions were considered for analysis if they were both admitted to and discharged from the vascular surgery service. The main outcome measured were both 3-day and 30-day readmission rates and length of stay (LOS). For each admission demographic, laboratory, and diagnosis data were extracted from our clinical information system. A Laboratory-based Acute Physiology Score (LAPS), a validated measure of acuity of illness, and a

Charlson co-morbidity score was calculated for each patient encounter. Patients cared for before and after the comanagement initiative was implemented were compared with respect to 3 and 30-day readmission rates and LOS using t-tests and Wilcoxon rank-sum tests as appropriate. In addition, survey data was collected from the participating hospitalists, assessing their satisfaction with various aspects of the program.

RESULTS: The study included 532 patients in the before comanagement period and 551 patients in the after comanagement period. Comanagement was associated with a significant reduction in the 3 day readmission rate (3.95 % before vs 1.27 % after; OR=0.31; $p=0.008$). This association remained strong and significant after adjustment for age, gender, race/ethnicity, insurance status, Charlson score and LAPS. However, comanagement was not associated with a significant difference in 30 day readmission rate, (22.93 % before vs 21.78 % after; $p=0.65$) or length of stay (6.50 days before vs 6.53 days after; $p=0.53$). The overall satisfaction score of the hospitalist providers was 4.14 (on a 5 point Likert scale), where all respondents either “agreed (4)” or “strongly agreed (5)” that they were satisfied with the service. More specifically, hospitalists felt valued and appreciated by the surgical team, were empowered to make independent decisions, and were satisfied with the level of communication and collegiality with the surgical team

CONCLUSIONS: A hospitalist-vascular surgery comanagement program was associated with a reduced 3-day readmission rate, but without change in the 30-day readmission rate or length of stay. The reduction in 3-day readmissions may reflect a hospitalist's expertise in transitions of care and medication management and thus an ability to improve patients' preparedness for discharge. A further analysis of the quality of care delivered in the pre- vs. post- co-management periods is planned.

VETERANS HEALTH ADMINISTRATION ELECTRONIC CONSULTATIONS: WOMEN'S HEALTH PRIMARY CARE PROVIDERS' PERCEPTIONS Kristina M. Cordasco^{1,2}; Jessica L. Zuchowski¹; Alison Hamilton^{1,2}; Canning Mark¹; LaShawnta Bell-Lewis¹; Joya G. Chrystal¹; Susan Kirsh^{4,3}; Donna L. Washington^{1,2}; ¹VA Greater Los Angeles Healthcare System, Los Angeles, CA; ²UCLA School of Medicine, Los Angeles, CA; ³Cleveland VA Medical Center, Cleveland, OH; ⁴VA Central Office, Washington, DC. (Tracking ID #2195043)

BACKGROUND: Primary care providers (PCPs) and specialists are increasingly using electronic consultations (e-consults) as a communication modality. We sought to capture Veterans Health Administration (VHA) PCP perceptions of the benefits, barriers and limitations of e-consults as implemented within VHA.

METHODS: Using a mixed-methods approach, we surveyed and interviewed VHA PCPs designated as women's health PCPs (WH-PCPs). WH-PCPs who utilized a gynecology e-consult were sent, within 7 business days of the completed consult, an e-mail invitation to complete a survey assessing their experience with that e-consult. Since PCPs could request multiple e-consults over time, we sent invitations to WH-PCPs no more frequently than every 21 days. Interim e-consults within the 21 data window were ineligible for prompting a survey request. Separately, as part of semi-structured interviews assessing for needs and perceptions of virtual care consultations and education, we asked WH-PCPs about their use of and experiences with e-consults across all specialties. All interviews were professionally transcribed and then summarized. Summaries were reviewed by two team members to identify themes related to e-consult benefits, barriers and limitations.

RESULTS: Between June and December 2014, 66 of 147 completed gynecology e-consults were eligible and prompted survey invitations to the WH-PCP requesting them. Twenty-five surveys were completed (38 % response rate) by 16 WH-PCPs. Twenty-three (92 %) of the surveys indicated that implementing all recommendations contained in the e-consult would be “very” or “somewhat” easy. The remaining two surveys (8 %) indicated that it would be “neither easy nor difficult” to implement the recommended treatment plan. Twenty (80 %) surveys indicated that the e-consult “definitely” provided the WH-PCPs with information that they could apply to the care of other patients. Between October 2012 and October 2014, we interviewed 32 WH-PCPs. All interviewees reported overall having a very positive experience with e-consults. All interviewees identified one or more benefits of e-consults, including increasing clinical efficiency, with both improving care timeliness and replacing/facilitating in-person specialty visits; being more convenient for patients; facilitating primary-care specialty communication; and enhancing WH-PCPs' knowledge and care quality. Nine WH-PCPs identified one or more barriers or limitations to e-consults including increased workload for primary care practices and providers implementing the specialist recommendations; specialists providing unclear or incomplete responses, and an in-person specialist visit being needed, rather than an e-consult, for some patients or aspects of care.

CONCLUSIONS: VHA WH-PCPs have an overall positive assessment of the role of e-consults in patient care, with a majority specifically benefitting from use of gynecology e-consults. However, some barriers and limitations were reported that should be addressed

when pursuing expansion or modification within VHA, or implementation in other care settings. As settings outside of VA expand use of electronic health records and consider uptake of e-consults, research should be directed toward quantifying e-consult benefits and cost-effectiveness.

VETERANS' PREFERENCES FOR SMOKING CESSATION TREATMENT David A. Katz; Kenda R. Stewart; Monica Paez; John Holman; Mark Vander Weg; Gary Gaeth. University of Iowa, Iowa City, IA. (Tracking ID #2199268)

BACKGROUND: Despite the evidence that counseling and pharmacotherapy significantly improve cessation rates, most veterans are reluctant to talk to a cessation counselor and many do not adhere to prescribed pharmacotherapy for smoking cessation (or prefer to quit “cold turkey”). Incorporation of patients' preferences into treatment decisions may improve patient satisfaction and adherence, but little is known about veterans' preferences for tobacco treatment. The goal of this study is to assess the importance of specific treatment attributes in driving the choice of smoking cessation counseling and pharmacotherapy using discrete choice experiment (DCE) methods.

METHODS: We conducted a semi-structured interview and cross-sectional survey of 30 current smokers who planned to quit smoking within the next 6 months and were active primary care patients (pts) in a single VA medical center and two affiliated community based outpatient clinics. Key attributes of tobacco treatment were initially based on literature review and were confirmed in semi-structured interviews. We selected an efficient subset of all possible treatment scenarios in order to develop separate DCE questionnaires for cessation counseling and pharmacotherapy. Pts were randomly assigned to counseling or pharmacotherapy versions of the questionnaire (15 choice sets each). We used multinomial probit models to estimate the marginal effect of changing a particular treatment attribute on the likelihood of treatment selection, accounting for clustering of choice data within subject.

RESULTS: Pts were predominantly middle-aged (mean 57.5 years) and smoked 18 cigarettes per day on average; 23 and 72 % had previously tried to quit with cessation counseling and medication, respectively. In the DCE analysis, pts were significantly more likely to choose a particular counseling option with the following treatment attributes: 1) excellent communication skills (“always listens and explains things”): +22 % [95%CI=11-32 %], 2) familiarity of the counseling (“someone whom you usually see”): +18 % [95%CI=12-25 %], and 3) group counseling format: +7 % [95%CI=2-13 %]. Minimal effects were observed for counselor's thoroughness, number of counseling sessions, or quit rate. Pts were significantly more likely to choose a particular pharmacotherapy option with the following attributes: 1) Higher quit rate: +10 % [95%CI=3-17 %], and 2) lower risk of medication-related side effects: +6 % [95%CI=0-11 %]. Minimal effects were observed for amount of weight gain during quit attempt and copayment.

CONCLUSIONS: To increase veterans' participation in smoking cessation counseling, cessation programs should focus on improving counselors' communication skills and building the capacity of clinic teams to provide cessation counseling (including group format). With regard to drug therapy, clinicians should emphasize the relative advantage of drug therapy in improving quit rates and should be particularly attentive to concerns regarding side effects. Future research should consider how to tailor tobacco treatment based on veterans' preferences.

VITAL SIGNS ARE STILL VITAL—ASSOCIATION BETWEEN INSTABILITY ON HOSPITAL DISCHARGE AND 30-DAY READMISSIONS AND MORTALITY Oanh K. Nguyen^{1,1}; Anil N. Makam^{1,1}; Christopher Clark²; Song Zhang¹; Bin Xie²; Ruben Amarasingham^{2,1}; Ethan Halm^{1,1}; ¹UT Southwestern Medical Center, Dallas, TX; ²Parkland Center for Clinical Innovation, Dallas, TX. (Tracking ID #2196001)

BACKGROUND: Instability on discharge has been previously shown to be associated with adverse clinical outcomes among hospitalized patients with pneumonia. However, little is known about the association between instability and outcomes among all hospitalized individuals. Thus, we sought to describe rates of instability on discharge among hospital patients and examine associations between instability on discharge on 30-day readmissions and mortality.

METHODS: This was an observational cohort study using EHR data from 6 hospitals in the Dallas-Fort Worth metroplex, including safety net, community, teaching, and non-teaching sites. We included hospital discharges from all internal medicine inpatient services among adults (≥18 years) between November 1, 2009 and October 30, 2010. We excluded inpatient deaths, transfers to an acute care facility, those who left against medical advice, and those discharged to hospice. Instability was defined as temperature ≥37.8 °C, heart rate >100 beats/min, respiratory rate >24 breaths/min, systolic blood pressure ≤90 mmHg, or oxygen saturation <90 %. The primary outcome was a composite

of death and any non-elective readmission to any of 75 acute care hospitals in North Texas within 30 days of discharge, both ascertained using an all-payer regional hospitalization database. We used logistic regression to adjust for demographic, clinical, and healthcare utilization characteristics, accounting for clustering at the hospital level.

RESULTS: Among 32,835 individuals, 18.7 % had ≥ 1 instability on discharge. Overall, 12.8 % of individuals with no instabilities on discharge died or were readmitted, compared to 16.9 % with 1 instability, 21.2 % with 2 instabilities, and 26.0 % with ≥ 3 instabilities ($p < 0.001$, Figure). The presence of any (≥ 1) instability on discharge was associated with higher risk-adjusted odds of either death or readmission (AOR 1.36, 95 % CI 1.26–1.48,

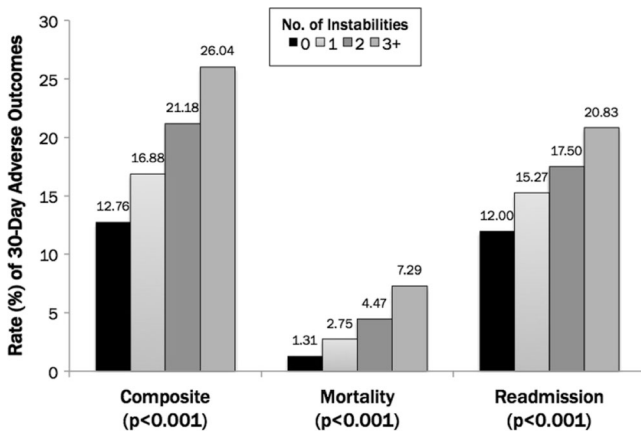
Table); this association was primarily driven by the increased odds of death. Individuals with ≥ 3 instabilities had a nearly 4-fold increase in the odds of death (AOR 3.91, 95 % CI 1.69–9.06), and an increased odds of 30-day readmission (AOR 1.36, 95 % CI 0.81–2.30) compared to individuals with no instabilities.

CONCLUSIONS: Instability on discharge is associated with increased risk of 30-day readmission and mortality. Discharge guidelines should include vital sign criteria for judging stability on discharge to improve disposition planning, post-discharge patient safety and to reduce 30-day mortality and readmission.

Table. Effects of Vital Sign Instability on Discharge on 30-Day Mortality and Readmission^a (N=32,835)

	Instabilities on Discharge				p-value
	Any	0	1	2	3
Composite					
Unadjusted	1.46 (1.35–1.57)	[Reference]	1.39 (1.28–1.51)	1.84 (1.54–2.20)	2.41 (1.52–3.80)
Adjusted	1.36 (1.26–1.48)	[Reference]	1.31 (1.21–1.43)	1.69 (1.40–2.04)	1.69 (1.03–2.75)
Mortality					
Unadjusted	2.36 (1.97–2.83)	[Reference]	2.14 (1.76–2.60)	3.54 (2.47–5.07)	5.94 (2.73–12.92)
Adjusted	2.31 (1.91–2.79)	[Reference]	2.12 (1.73–2.60)	3.31 (2.26–4.86)	3.91 (1.69–9.06)
Readmission					
Unadjusted	1.36 (1.26–1.47)	[Reference]	1.32 (1.22–1.44)	1.56 (1.29–1.88)	1.93 (1.18–3.16)
Adjusted	1.26 (1.16–1.37)	[Reference]	1.24 (1.13–1.35)	1.40 (1.15–1.71)	1.36 (0.81–2.30)

^a Data are odds ratio (95 % confidence interval) unless otherwise specified. Adjusted odds ratios control for demographic, clinical and healthcare utilization characteristics.



WAM! WEEK OF ADDICTION MEDICINE: AN INTENSIVE CURRICULUM FOR INTERNAL MEDICINE-PRIMARY CARE INTERNS Elenore P. Bhatraju⁶; Sienna Kurland⁴; Laura Van Metre Baum⁷; Andrew A. Chang³; Jessica Taff⁴; Jaclyn Fox¹; Mack Lipkin⁵; Kathleen Hanley². ¹Manhattan VA & NYU SoM, New York, NY; ²NYU, New York, NY; ³NYU/Gouverneur, New York, NY; ⁴New York University, New York, NY; ⁵New York University School of Medicine, New York, NY; ⁶Virginia Mason, Seattle, WA; ⁷Montefiore Medical Center, New York, NY. (Tracking ID #2198070)

BACKGROUND: Medical residencies inadequately address substance use (SU) disorders despite their significant contribution to disability, death, and healthcare costs. Physicians avoid counseling and treating patients with SU disorders because of discomfort discussing SU with patients, poor baseline knowledge and clinical skills, and negative attitudes towards SU. We undertook to improve SU education in a primary care residency by designing and implementing an intensive weeklong addiction medicine curriculum for interns and assessed its impact on knowledge, skills, and attitudes.

METHODS: The curriculum utilized a learner-centered, experiential education model. Sessions included lectures, guided discussions, patient interviews, journal club, and

treatment site visits. Content included neurobiology of addiction, opiates, alcohol, motivational interviewing (MI), brief interventions, harm reduction, and policy. MI training included theory, skills based practice, and coaching sessions. Knowledge and attitudes were assessed by pre- and post-test: 18 questions tested clinical knowledge; eight assessed confidence and attitudes using a Likert scale from (1) strongly disagree to (5) strongly agree. For the four questions pertaining to confidence, a composite “confidence score” was computed (Cronbach’s alphas > 0.85 for both pre- and post-tests). The intern cohorts were similar and analyzed together.

RESULTS: The curriculum was implemented in March 2013 ($n=9$) and March 2014 ($n=8$). Fifteen pre-tests and 17 post-tests were completed. The clinical knowledge mean test score improved from 50 to 70 % ($p < 0.0005$). The mean confidence score increased from 2.7 to 4.2 ($p < 0.0005$). Post-test, 94 % of participants somewhat or strongly agreed that treating SU is rewarding, vs. 69 % baseline. Eighty-eight percent somewhat or strongly believed they could make a difference in their addicted patients, compared to 57 % baseline. Participant feedback was strongly positive.

CONCLUSIONS: Baseline knowledge and confidence were poor. Knowledge, confidence, and attitudes towards SU improved after WAM. Further assessment is needed to determine if the effects are durable and translate into improved provider satisfaction, patient counseling and treatment, and health outcomes.

WATERPIPE TOBACCO SMOKING AMONG US YOUNG ADULTS BOTH IN AND NOT IN SCHOOL: A NATIONALLY-REPRESENTATIVE STUDY Brian A. Primack¹; Ariel Shensa¹; Jaime Sidani¹; Jason Colditz²; Judith Brook³; Michael J. Fine². ¹University of Pittsburgh, Pittsburgh, PA; ²VA Pittsburgh Healthcare System, Pittsburgh, PA; ³New York University, New York, NY. (Tracking ID #2197948)

BACKGROUND: A global resurgence of waterpipe (“hookah”) tobacco smoking (WTS) has resulted in a spread into Western nations, especially within the past decade. Many factors contribute to this trend, including misperceptions about the safety of WTS and its harm reduction capabilities, addition of sweeteners and flavorings, the belief that WTS is not addictive, and its social acceptability. However, WTS exposes users to tar, carbon monoxide, nicotine, polyaromatic hydrocarbons, and other toxicants, often in levels that are higher than that of smoking a single cigarette. WTS has been most commonly studied among adolescents and college students, and it is clearly increasing substantially among these populations. For example, nationally-representative data from 2014 showed that over 20 % of high school seniors engaged in the practice in the past year. However, to our knowledge, there has not yet been a large-scale, nationally representative study examining WTS behaviors and related factors that focuses on young adults, especially those who are not necessarily in college. Therefore, we aimed to fill this gap.

METHODS: Research participants were members of a nationally-representative probability-based online non-volunteer access panel recruited and maintained by an established organization called GfK (“Growth from Knowledge”). The panel was created

with a combination of random-digit-dialing and address-based sampling, creating a sampling frame including an estimated 97 % of US households. For this study, we commissioned GfK to recruit and survey approximately 3000 adults ages 18–30. The online survey was sent to a randomly selected sample of panel members in March of 2013 and was active for a 1-month period. For our outcome variable, respondents were asked to report on their ever and current (within the past 30 days) WTS behavior. In addition to WTS, we assessed many relevant socio-demographic factors potentially related to WTS, including age, sex, sexual orientation, race and ethnicity, relationship/marital status, living situation, and household income. We used survey weights to estimate national rates of ever WTS and current WTS by each of the key socio-demographic characteristics. Finally, we used multivariable logistic regression to examine independent associations between the socio-demographic independent variables and each of two key dependent variables: ever WTS and past-30-day WTS. Because prior national data have focused on school (i.e. university) populations but not community-based populations, we stratified both bivariable and multivariable analyses by status in school (e.g., college, university) vs. not in school.

RESULTS: Our sample consisted of 3131 young adults ages 18–30 of whom 1360 (43 %) were in school and 1771 (57 %) were not. Based on all participants, weighted data showed that 31 % were ever users of WTS while 5 % had used WTS in the past 30 days. When data were stratified, ever use was 36 % among participants in school and 30 % among participants not in school, and current use was 7 % among participants in school and 4 % among participants not in school. However, in some subgroups non-school participants had similar or higher usage rates. For example, among the youngest participants (ages 18–20), ever use was 26 % among participants in school and 30 % among participants not in school, and current use was 8 % for both school and non-school populations. Multivariable models demonstrated that a distinct set of socio-demographic factors was independently associated with WTS in the different (school vs. non-school) groups. Among participants in school, only bisexuality was significantly associated with increased current WTS (vs. heterosexual, AOR=3.36, 95 % CI=1.32, 8.53). Among participants not in school, however, lower current WTS was associated with being 27–30 (vs. 18–20, AOR=0.12, 95 % CI=0.04, 0.34), being married (vs. single, AOR=0.17, 95 % CI=0.07, 0.43), living with a significant other (vs. living alone, AOR=0.36, 95 % CI=0.13, 0.97), and having a household income of \$60,000 or above (vs. under \$25,000, AOR=0.26, 95 % CI=0.10, 0.68).

CONCLUSIONS: Among young adults, WTS is common not only in school-based populations (e.g., colleges and universities) but also in community-based populations. In fact, in certain subgroups, such as those 18–20, WTS may be higher among community-based populations. For this reason, surveillance and clinical counseling should extend to all young adults and not only those in school-based settings. When providing counseling and/or considering educational and policy intervention, it may be valuable to keep in mind that different socio-demographic factors are associated with WTS use among school and non-school populations. In particular, while among school-based populations only bisexuality is strongly associated with use, in non-school populations use seems to be highest among young, single, less affluent individuals living alone.

WATERPIPE TOBACCO SMOKING DEPENDENCE AMONG US YOUNG ADULTS Jaime Sidani¹; Saul Shiffman²; Ariel Shensa¹; Galen E. Switzer¹; Brian A. Primack¹. ¹University of Pittsburgh, Pittsburgh, PA; ²Pinney Associates, Pittsburgh, PA. (Tracking ID #2198152)

BACKGROUND: Waterpipe tobacco smoking (WTS) is the practice of smoking tobacco heated by lit charcoal through a small hose connected to a liquid-filled bowl. Traditionally associated with the Eastern Mediterranean Region, WTS has been increasing in popularity among US young adults despite evidence of its toxicant content and potential negative health effects. Many waterpipe smokers in the US believe WTS to be safer than traditional cigarette smoking, a misconception likely perpetuated by the belief that WTS exposes users to little or no nicotine, therefore leading to a reduced potential for dependence. While preliminary evidence from the Eastern Mediterranean Region suggests the potential for WTS to produce dependence in its users, there has been little research into WTS dependence among US users. To address this gap in the literature, we conducted a nationally-representative study of WTS dependence among US young adults.

METHODS: We assessed 436 past-year waterpipe tobacco users ages 18–30, who were part of a national probability-based online non-volunteer access panel randomly selected to participate in a study of WTS behaviors. These participants were presented with 6 dichotomous WTS dependence items adapted for the US young adult population from two existing scales: the Lebanon Waterpipe Dependence Scale (LWDS) and the Fagerstrom Test for Cigarette Dependence (FTCD). To examine the underlying structure of the dependence items, we created a pairwise correlation matrix and performed exploratory factor analysis with Varimax rotation. Participants were also asked about 5 behavioral dependence indicators that we expected to be associated with WTS dependence, such as

age of initiation and frequency of use. Individual regression analyses were performed to assess associations between the WTS dependence scale and the 5 behavioral dependence indicators, adjusting for all socio-demographic variables. Additionally, we calculated continuous and categorical summary scores of the dependence items to further assess associations with the behavioral dependence indicators.

RESULTS: Our sample was 55 % male, 58 % Caucasian non-Hispanic, 11 % African-American non-Hispanic, 24 % Hispanic, and 6 % of mixed or other race. Factor analysis suggested that the 6 dependence items represented one internally consistent factor (Cronbach's alpha=0.75). The range of endorsement for the WTS dependence items varied from 3.2 to 14.9 %, with the highest endorsement for engaging in WTS when the participant was so sick that he or she stayed home from work or school (14.9 %). In fully adjusted regression models, dependence items were strongly and consistently associated with each of the 5 behavioral dependence indicators. When the WTS dependence items were analyzed as a categorical summary score, 15.5 % of participants endorsed 2 or more dependence items. Compared with those who did not endorse any of the 6 dichotomous dependence items, the participants who endorsed 2 or more items had an adjusted odds ratio of 4.08 for waterpipe ownership, 3.03 for smoking more bowls per session, 23.42 for participating in more sessions per day, 5.23 for initiating use at a younger age, and 3.28 for WTS in the past 30 days.

CONCLUSIONS: Six WTS dependence items adapted from traditional tobacco dependence measures appear to be valuable for assessing WTS dependence among US young adults. Use of these items as a categorical scale may be useful for clinicians or other healthcare workers as a brief assessment tool to screen for WTS dependence. Although future work is needed to further extend validity by determining associations between these 6 items and other indications of dependence, such as increases in WTS over time, this work represents useful groundwork toward assessment of WTS dependence among US young adults.

WE NEED MORE: ADDING PEER SUPPORT AND GROUP COUNSELING TO BUPRENORPHINE MAINTENANCE TREATMENT IN PRIMARY CARE THROUGH GROUP MEDICAL VISITS Aaron D. Fox^{1, 2}; Mariya Masyukova². ¹Montefiore Medical Center, Bronx, NY; ²Albert Einstein College of Medicine, Bronx, NY. (Tracking ID #2198955)

BACKGROUND: Opioid addiction and overdose deaths have reached epidemic proportions in the United States, but most Americans with opioid use disorder remain out of treatment. Stigma associated with addiction may be reduced by offering opioid addiction treatment in primary care with buprenorphine maintenance treatment (BMT). Office-based BMT is safe and effective, but the inability to provide intensive behavioral counseling has prevented many primary care physicians from adopting BMT. Group medical visits (or shared medical appointments) utilize a multi-disciplinary team of providers to deliver health education, behavioral counseling, and medical management to multiple patients with chronic conditions. BMT group medical visits may be a good option for intensifying behavioral counseling in office-based BMT, but they have not been studied. In preparation for development of a model of BMT group medical visits, we investigated the perceptions of BMT patients toward offering BMT as a group.

METHODS: For this qualitative study we conducted five focus groups with past or present BMT patients in New York City who had previously indicated interest in participating in clinical research. We developed a semi-structured interview guide with questions relating to past experiences with BMT and therapeutic group counseling. We described group medical visits as a hypothetical option for BMT. Focus groups lasted an hour and were audio-recorded. Participants were compensated with \$20 and transit passes. Analysis was conducted with a grounded theory approach. Transcriptions of recordings were read, coded, and discussed in an iterative process. We created a list of “repeating ideas” by consensus based on the first two transcripts and then used these as codes for all transcripts. We then organized data into categories of increasing complexity, identifying common “themes” from the repeating ideas, and developing “theoretical constructs” based on these themes and our initial research question. We continued to conduct focus groups until reaching thematic saturation, which occurred when no new repeating ideas were identified from transcripts.

RESULTS: Of the 33 participants in the 5 focus groups (range: 3–11 participants), median age was 50 and most were male (N=28), Hispanic (20), and had experiences with therapeutic groups (21). Participants unanimously reported that therapeutic groups could potentially complement BMT, addressing the mental component of addiction while the medication addressed the physical component; however, there was disagreement about whether groups were necessary for most BMT patients. Some participants were highly satisfied with BMT provided by their primary care physician and did not think additional group counseling was necessary. Other participants desired more intensive treatment (e.g., “If we just had to see one doctor, that works all right for a little while, but we need more.

So the group comes in"). For participants in favor of combining groups with BMT, the perceived added benefits of groups were peer support, diverse sources of psychoeducation (e.g., "Different people have different information. And it's not even the counseling. We get it all from each other"), validation (e.g., "Being in groups with people that I know were going through the same thing that I was going through just validates it even more that I'm doing the right thing and the [buprenorphine] is working"), and being held accountable to the group. Concerns about combining groups with BMT were confidentiality, time commitment and decreased individual attention from the physician.

CONCLUSIONS: Focus groups with BMT patients demonstrated enthusiasm for the potential of BMT group medical visit; however, there was some concern about confidentiality, increased time commitment, and inadequate individual attention. Because some participants preferred the privacy and ease of receiving BMT at standard primary care visits, BMT group medical visits will not be acceptable to all BMT patients. Therefore, it may be best to target BMT patients who are unable to achieve abstinence with medical management alone for BMT group medical visits. Because participants highly valued their interactions with peers (e.g., validation), while developing BMT group medical visits, we will investigate the precise mechanisms supporting behavior change (behavioral counseling vs. peer support). BMT group medical visits are a promising model to deliver behavioral counseling and medical management of opioid addiction, while also capitalizing upon peer support. We are currently conducting a pilot study to test the feasibility of BMT group medical visits.

WHAT ARE THE BEST WAYS TO IMPROVE MEDICATION RECONCILIATION PRACTICES? AN ON-TREATMENT ANALYSIS OF THE MARQUIS STUDY Jeffrey L. Schnipper^{5, 10}; Jason Stein^{6, 7}; Tosha B. Wetterneck^{3, 8}; Peter Kaboli^{1, 9}; Stephanie Mueller^{5, 10}; Amanda S. Mixon⁴; Stephanie Labonville⁵; Jacquelyn A. Minahan⁵; Elisabeth Burdick⁵; Endel John Orav⁵; Jenna Goldstein¹¹; Nyryan V. Nolido²; Sunil Kripalani¹². ¹Iowa City VAMC, Iowa City, IA; ²Northwestern University, Boston, MA; ³University of Wisconsin School of Medicine and Public Health, Madison, WI; ⁴VA Tennessee Valley Healthcare System and Vanderbilt University, Nashville, TN; ⁵Brigham and Women's Hospital, Boston, MA; ⁶Emory University Hospital, Atlanta, GA; ⁷Emory University School of Medicine, Atlanta, GA; ⁸University of Wisconsin Madison, Madison, WI; ⁹University of Iowa Hospitals and Clinics, Iowa City, IA; ¹⁰Harvard Medical School, Boston, MA; ¹¹Society of Hospital Medicine, Philadelphia, PA; ¹²Vanderbilt University Medical Center, Nashville, TN. (Tracking ID #2199237)

BACKGROUND: Many hospitals have tried to improve their medication reconciliation processes, with mixed results. Currently, there are insufficient data to guide hospitals in the best ways to improve their practices. In the Multi-Centered Medication Quality Improvement Study (MARQUIS), sites chose to implement one or more components from a multifaceted toolkit. The goal of this analysis was to determine which components were associated with the greatest improvements in medication safety.

METHODS: Five U.S. hospitals participated in this quality improvement (QI) study between September 2011 and July 2014. With the guidance of trained mentors and using standard QI principles, each site implemented one or more of 11 intervention components. Sites were provided with an implementation manual and toolkit. Mentors conducted monthly phone calls and two site visits during the intervention period. The primary outcome was the number of potentially harmful unintentional medication discrepancies per patient, measured in approximately 22 randomly selected patients per month during a 6-month baseline period and throughout the intervention. To determine the most effective components of the intervention, we categorized all QI activities conducted by any site by component, including date(s) of implementation. We analyzed the data using Poisson regression to detect sudden reductions in potentially harmful discrepancy rates temporally associated with each implementation of each intervention component across all sites.

RESULTS: We identified 668 patients on intervention units during the post-implementation period. In on-treatment analyses, one intervention component was associated with significant reductions in potentially harmful discrepancies: hiring new staff (usually pharmacists) to assist with both medication reconciliation and patient counseling at discharge (incidence rate ratio 0.16 (95% CI 0.08 to 0.33)). Two components were associated with increases in discrepancy rates: training existing staff to take medication histories (IRR 1.27 (1.01 to 1.59)), and implementing a new electronic medical record (IRR 3.38 (1.65 to 6.93); Table 1).

CONCLUSIONS: We found that hiring additional pharmacy staff to assist with discharge reconciliation and patient counseling was the most effective component of a medication reconciliation QI program. Conversely, training existing staff to take medication histories was shown to increase potentially harmful discrepancies, perhaps because it leads to diffusion of responsibility or delays in hiring new staff, which could consolidate this role in a few well-trained personnel. Lastly, external factors, such as EMRs that are not designed and/or implemented optimally, were also shown to adversely affect discrepancy rates.

Table 1. Effects of Individual Intervention Components on Potentially Harmful Medication Discrepancies

Intervention Component	Incidence Rate Ratio (95% CI)	P value
Hiring additional staff to perform discharge medication reconciliation and patient counseling	0.16 (0.08 to 0.33)	<0.001
Training existing staff to perform discharge medication reconciliation and patient counseling	0.76 (0.45 to 1.26)	0.28
Hiring additional staff to take preadmission medication histories	1.17 (0.54 to 2.53)	0.68
Training existing staff to take preadmission medication histories	1.27 (1.01 to 1.59)	0.04
Making improvements to existing medication reconciliation health information technology	0.70 (0.08 to 5.84)	0.74
Performing high-intensity interventions on high-risk patients	0.92 (0.74 to 1.14)	0.45
Clearly defining roles and responsibilities and communicating this with clinical staff	0.62 (0.34 to 1.15)	0.13
Improving access to pre-admission medication sources	1.07 (0.65 to 1.75)	0.80
Implementing a new electronic medical record	3.38 (1.65 to 6.93)	<0.001

WHAT ARE THE CONTRIBUTING FACTORS TOWARDS OVERLY AGGRESSIVE CARE AT THE END OF LIFE? Elizabeth Dzung^{2, 4}; Thomas J. Smith¹; David M. Levine³. ¹Johns Hopkins, Baltimore, MD; ²Johns Hopkins School of Medicine, Baltimore, MD; ³Johns Hopkins U., Balt., Md., MD; ⁴University of Cambridge, Cambridge, United Kingdom. (Tracking ID #2193113)

BACKGROUND: Conversations surrounding the medical profession and society's understanding of death and dying have been in the spotlight in both the United States and United Kingdom. The Institute of Medicine's recent report on "Dying in America" highlights the many challenges that occur in end of life care, especially that most patients want to die at home comfortably, but the system is geared towards a default of aggressive care. The aim of this study was to understand factors that contribute to overly aggressive care at the end of life in the American health care system.

METHODS: Semi-structured in-depth interviews were conducted with 58 internal medicine doctors across four sites (New York, Baltimore, Seattle and Cambridge, England), who were routinely involved in DNR conversations with end of life patients. Participants were purposively sampled by stage of training and subspecialty to provide a wide range of perspectives and contribute to understanding emerging patterns and themes. Interviews lasted on average 60 min and were audio-taped and transcribed. Transcripts were analyzed and double coded using thematic analysis with an interpretive approach.

RESULTS: The interviews revealed many factors that contributed towards overly aggressive care at the end of life in the United States. These factors can be broadly categorized as patient, surrogate, physician, or systemic factors. Systemic or cultural factors included frequent mentions of cultural norms that fear death and defaults within the health system that result in an inadvertent drive towards overly aggressive care. Technological advances and legal concerns also contributed. Physician factors included delays in discussing death and delays regarding treatment decisions and overall prognosis. In contrast to experienced physicians, less experienced physicians (i.e. residents and fellows) sometimes felt compelled to offer a menu of choices including those unlikely to work such as futile resuscitation. In addition, they more frequently discussed patients who "wanted everything" or that they "did everything." Patient and surrogate factors frequently include a denial of death, unrealistic expectations, and surrogates' feelings of guilt over "killing their loved one." Comparisons are made to the UK where differing policies and philosophies regarding distribution of resources engendered a system that encouraged care that was less aggressive than their American counterparts. Medical trainees often remarked that there were few formal and informal opportunities to discuss issues surrounding death and dying during residency, which contributed to discomfort in discussing death. The notable exception was the Seattle hospital site, whose fortnightly "Death Rounds" discussions sharing experiences about dying patients, seemed to foster greater comfort in communicating issues of death and dying amongst house staff.

CONCLUSIONS: There are myriad factors at a societal, physician, surrogate, and patient level that drive the culture of overly aggressive care in American hospitals. The majority of these factors stem from challenges in discussing and accepting death at a societal and individual level. Targeted interventions to improve physician and institutions' ability to communicate with patients and accept death as a natural part of the life course rather than something to be defied, might decrease overly aggressive care at the end of life.

WHAT DO INTERNAL MEDICINE RESIDENTS SAY ABOUT INTERNSHIP PREPARATION? FINDINGS FROM AN INTERNAL MEDICINE IN-TRAINING EXAMINATION SURVEY Heather Harrell²; Anne Pereira³; T. R. Vu¹; Greg Kane⁴. ¹Indiana University, Carmel, IN; ²University of Florida, Gainesville, FL; ³University of Minnesota, Duluth, MN; ⁴Jefferson, Philadelphia, PA. (Tracking ID #2145569)

BACKGROUND: Medical educators have identified important skills to prepare students for internship.¹⁻³ One small survey of PGY1 residents in 2002 addressed the question of internship preparation but the results may be dated, for in the interim there has been widespread adoption of EMRs and duty hour changes that have highlighted skills such as handoffs.³ Recently, a small qualitative study of PGY2 residents addressed the value of the 4th year of medical school to internship preparation in several specialties.⁴ The purpose of this study was to obtain feedback from a large stakeholder group regarding what they found most valuable from the 4th year of medical school for internal medicine (IM) internship preparation to help educators better advise and prepare medical students pursuing careers in IM.

METHODS: All IM residents taking the 2013 In-Training Exam were asked to use a drop down menu of 11 common 4th year courses to rank which three were most helpful for internship preparation and to rank the importance of learning ten pre-defined skills prior to residency. The ten skills were chosen based on prior literature, a national subinternship curriculum, and expert consensus.^{1-3, 5-6} Results were analyzed with descriptive statistics and t-tests.

RESULTS: Table 1 demonstrates the ranking responses for 4th year courses in descending order of helpfulness to internship preparation. Comparing rankings by training level revealed that PGY1 residents selected subinternship, EM rotation, and subspecialty electives significantly more often and critical care and ward rotations significantly less often than PGY2 and 3 residents ($p < 0.01$). Table 2 shows all residents' ratings of the importance of 10 skills for internship. While there were statistically significant differences between the ratings by PGY1, 2, and 3 residents of skill importance, the absolute differences between years were small.

CONCLUSIONS: This is the largest study describing which medical school rotations and skills a key stakeholder group, current IM residents, found most helpful for internship preparation. The results confirm prior studies highlighting the perceived value of a subinternship and clinical rotations for internship preparation. Also, there is strong agreement between IM residents and medical educators about which skills are important to learn prior to internship.^{2, 4, 7} Capstone courses, often developed specifically for internship preparation, were rarely ranked as most helpful for internship preparation. Allowing residents to rank only their top three courses may under recognize the absolute perceived value of a course. This information should help inform curriculum development and student advisement to improve IM internship preparation. References 1. Langdale LA, et al. Preparing graduates for the first year of residency: Are medical schools meeting the need? *Acad Med.* 2003; 78:39-44. 2. Lyss-Lerman P, et al. What training is needed in the fourth year of medical school? Views of residency program directors. *Acad Med* 2009;4:823-9. 3. Sidlow R, et al. The internal medicine subinternship: A curriculum needs assessment. *JGIM* 2002;17:561-4. 4. O'Brien B, et al. Residents' perspectives on the final year of medical school. *IJME.* 2012;3:151-8. 5. CDIM Internal Medicine Subinternship Curriculum. <http://www.im.org/p/cm/ld/fid=373> 6. Harrell H, et al. Primer to the Internal Medicine Subinternship. MedEdPORTAL; 2012 www.mededportal.org/publication/9277 7. Angus S, et al. What Skills Should New Internal Medicine Interns Have in July? A National Survey of Internal Medicine Residency Program Directors. *Acad Med.* 2014;89 (3):432-5.

Percentages of respondents who ranked select 4th year courses in top three of most helpful for internship preparation

Course	All Residents (n=19362)	PGY1 (n=6590)	PGY2 (n=6772)	PGY3 (n=6000)
Subinternship	63	65	63	62
Ward rotation	60	57	60	63
IM subspecialty elective	45	48	45	44
Critical Care	41	37	42	43
Emergency Medicine	21	25	20	18
Ambulatory Medicine	19	19	18	20
Non-IM subspecialty elective	7	8	7	7
International elective	7	8	7	6
Procedures elective	4	4	4	4
Capstone course	3	3	3	2
Nonclinical elective	2	2	3	2

Percentiles of respondents' ratings of the importance of select skills in preparation for internship

Skill	Very important	Somewhat important	Not important
Identifying when to seek help	89	10	1
Prioritizing tasks and managing time efficiently	88	11	1
Communicating with other providers around transitions of care	83	16	1
Practicing EBM at point of care	79	20	1
Reflecting on performance and identifying steps for improvement	77	21	2
Communicating with consultants	76	22	2
Providing a prioritized/organized sign out	71	25	4
Communicating with non-physician team members	68	30	3
Recognizing burnout/depression in self and others	64	32	4
Obtaining informed consent	60	33	8

WHAT IS SPECIALTY CARE COORDINATION? PERSPECTIVES OF THE "TRIAD"—PATIENT, PCP AND SPECIALIST Varsha Vimalananda^{1, 3}; Kelly Dvorin¹; Dan Berlowitz^{1, 4}; Graeme Fincke^{1, 4}; Mark Meterko^{2, 4}; Barbara G. Bokhour^{1, 4}. ¹ENRM Veterans Affairs Medical Center, Bedford, MA; ²VA Boston Healthcare System, Boston, MA; ³Boston University School of Medicine, Boston, MA; ⁴Boston University School of Public Health, Boston, MA. (Tracking ID #2195820)

BACKGROUND: Specialty care coordination is critical to success of the patient-centered medical home. However, each participant in the "specialty care triad"—patient, PCP, and specialist—brings a different perspective to the specialty care referral process. We have little understanding of the common and unique elements of well-coordinated specialty care from each perspective. We sought to understand the meaning of successful specialty care coordination for each triad member, using diabetes as a case study.

METHODS: We conducted semi-structured telephone interviews with 12 primary care providers and 13 endocrinologists at 25 US Veterans Affairs Medical Centers and Community-based Outpatient Clinics across the country in 2014. We conducted two focus groups with Veterans with diabetes (N=9) at one urban and one rural VAMC. Interviews and focus groups were audiorecorded and transcribed. We analyzed the data using grounded thematic analysis, a systematic approach to deriving qualitative themes from textual data. We used constant comparative methods to compare findings from different triad member types. We sought to identify overlapping as well as distinctive themes from each group of participants.

RESULTS: Results: We identified six interrelated domains; each was important for all three types of triad members: 1) *Interpersonal communication*; 2) *Relationships*; 3) *Roles and responsibilities*; 4) *Information transfer*; 5) *Access to services*; and 6) *Avoiding unnecessary visits*. Within the domains, certain themes were common to all triad member types; others were unique to one or two. 1) *Interpersonal communication* and 2) *Relationships*: For patients, it was important to feel that either someone in the healthcare system understood and could manage all aspects of their care, or that they were provided tools enabling them to manage their own care in the absence of a perfectly-functioning system. Easy access to timely communication with a specific provider was important in this regard. Most often, patients named a particular nurse rather than a PCP or endocrinologist who helped them navigate their diabetes in a complex healthcare system over time. Both PCPs and endocrinologists described many system-level barriers to coordination, and in this setting, having personal relationships was critical to accomplishing needed tasks. When providers knew each other personally, they were more likely to call or email directly with questions and to receive a helpful response. 3) *Roles and responsibilities*: Patients described coordination of specialty care as either their job or that of the PCP, viewing the endocrinologist's role as limited to clinical care, explaining things clearly, and honoring appointment times. PCPs and endocrinologists wished for greater clarity in provider roles and responsibilities and an increased sense of shared goals. Frustration over shortcomings in these areas was compounded by poor relationships and limited communication. 4) *Information transfer*: Patients discussed the patient-accessible online health record and secure messaging as effective ways to track and manage their health care needs; this was an important piece of feeling that they were in control. Providers described the need for organized and meaningful information transfer with each other and the importance of making special efforts to communicate when information needed follow up. 5) *Access to services*: Timeliness in access to services was important to all three triad member types. All three discussed access to endocrinology appointments, PCPs discussed

access to specialty expertise through e-consults, and endocrinologists' concerns included obtaining insulin pumps and continuous glucose monitors. 6) *Avoiding unnecessary visits*: Patients wanted phone or secure messaging to replace clinic visits when possible. Endocrinologists saw triage of consults as a critical strategy to manage limited clinic availability. However, triage mechanisms such as service agreements and e-consults were sometimes seen by PCPs as methods of "blocking" access to specialty care.

CONCLUSIONS: Success in specialty care coordination is perceived in overlapping, but not identical, ways by patients, PCPs, and endocrinologists. These findings have implications for how we understand specialty care coordination and for the development of interventions to improve it. For all three triad member types, *Relationships* and *Interpersonal communication* emerged as particularly important domains of coordinated care in a complex and sometimes difficult-to-navigate system. However, interventions should account for differing perspectives within the domains. For example, for patients, it is important to ensure that a specific person is the "hub" of coordination, which could be the patient or a non-MD provider. For PCPs and endocrinologists, interventions that foster personal relationships between providers are needed, and may positively impact multiple aspects of specialty care coordination.

WHO IS RESPONSIBLE FOR WHAT TASKS WITHIN PRIMARY CARE: PERCEIVED TASK ALLOCATION AMONG PRIMARY CARE PROVIDERS AND INTERDISCIPLINARY TEAM MEMBERS

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BACKGROUND: Unclear roles in interdisciplinary primary care teams are an impediment to achieving optimal team-based patient centered primary care. We assessed perceived allocation of a set of commonly performed clinical tasks among primary care providers (PCPs) and staff during early implementation of Patient Aligned Care Teams (PACT), a new patient-centered care model in Veterans Health Administration (VHA) primary care practices.

METHODS: We performed a cross sectional survey of all PCPs and primary care staff in 21 primary care practices within one VHA administrative region covering Southern California and Nevada. We asked PCPs (Physicians, Nurse Practitioners and Physician Assistants) which of 14 common primary care tasks they carried out on their own versus relied on help from staff. We also asked three categories of primary care staff members (registered nurses (RNs), licensed practical nurses (LPNs), and medical assistants/clerical staff) for which of the same 14 tasks they were relied upon by PCPs. We also performed multivariable regression to determine what provider characteristics and elements of PACT implementation were associated with perceived sharing of a given task.

RESULTS: One hundred sixty-two PCPs and 257 staff members responded, a 57 % response rate. Survey results are presented in the table. A minority of PCPs reported relying on staff for 12 of 14 tasks. Very few PCPs reported relying on staff for evaluating patients and making treatment decisions (2 % reported relying on staff), tracking diagnostic data (8 %), and handling forms for patients (14 %), while a slight majority reported relying on staff for receiving messages from patients (63 %), and screening patients for diseases (62 %). Conversely, over 85 % of registered nurses reported they were relied upon for all 14 tasks. All RNs reported being relied upon for receiving and resolving messages, and 98 % reported being relied upon for educating patients about diseases, responding to prescription refill requests, and tracking patient diagnostic study data. A majority of LPNs reported they were relied upon for 13 of 14 of tasks, with the exception of responding to requests for home health care orders where 44 % of LPNs reported being relied upon. A majority of medical assistants/clerical staff reported being relied upon for only 5 of 14 tasks, specifically receiving messages from patients (95 %), resolving messages from patients (88 %), and responding to prescription refill requests (77 %). Multivariable regression demonstrated no association between task sharing and years working in the clinic, or number of clinical sessions per week. Nurse Practitioners/Physician Assistants were less likely than physicians to report relying on staff for screening patients for diseases (OR 0.36, 95 % CI 0.15–0.85), educating patients about disease specific self care activities (OR 0.18, 95 % CI 0.05–0.63), and receiving messages from patients (OR 0.36, 95 % CI 0.15–0.87). For PCPs, increased PACT training was associated with increased sharing of the tasks gathering patient preventive services history (For each 10 h interval of PACT training, OR 1.19, 95 % CI 1.03–1.37), screening patients for diseases (OR 1.25, 95 % CI 1.05–1.47), and evaluating patients and making treatment decisions (OR 1.59, 95 % CI 1.18–2.13).

CONCLUSIONS: Early in implementation of a team-based primary care model, most PCPs perceived they were solely responsible for most clinical tasks. Registered nurses,

and licensed practical nurses felt they were relied upon for most of the same tasks, suggesting suboptimal understanding between nurses and PCPs regarding task allocation. Medical assistants/clerical staff reported being relied on for fewer tasks, suggesting their roles could be expanded. Better understanding of optimal inter-professional team task allocation in primary care is needed.

Proportion of PCPs, RNs, LPNs and clerical staff reporting that PCPs rely on staff for a given task

Task	PCP* (162)	RN** (103)	LPN** (110)	Clerical Staff** (43)
Gathering patient preventive services utilization history (e.g., immunization history)	41 %	87 %	97 %	30 %
Screening patients for diseases (e.g., doing a depression screen)	62 %	93 %	98 %	19 %
Evaluating patients and making treatment decisions	2 %	98 %	62 %	14 %
Intervening on patient lifestyle factors (e.g., diet, smoking cessation)	19 %	100 %	96 %	14 %
Educating patients about disease-specific self-care activities (e.g., foot care in diabetes)	29 %	98 %	92 %	16 %
Educating patients about medications	30 %	99 %	94 %	23 %
Responding to prescription refill requests	31 %	98 %	96 %	77 %
Receiving messages from patients (other than requests for prescriptions)	63 %	100 %	97 %	95 %
Resolving messages from patients (other than requests for prescriptions)	48 %	100 %	96 %	88 %
Handling forms for patients (e.g., disability documentation)	14 %	89 %	52 %	67 %
Tracking patient diagnostic data (e.g. labs, radiology studies)	8 %	98 %	74 %	49 %
Responding to patient diagnostic and treatment data (e.g. labs, radiology studies)	8 %	95 %	65 %	30 %
Following-up on referrals (e.g., to specialists)	17 %	97 %	76 %	65 %
Responding to requests for Home Health Care orders	20 %	92 %	44 %	28 %

*Percent of PCPs indicating they rely upon staff (vs. perform alone without help)

**Percent of staff indicating they are relied upon

WHO SHOWS UP AND LOSES? PREDICTORS OF ATTENDANCE AND WEIGHT LOSS IN URBAN AFRICAN AMERICAN WOMEN IN THE STRIDES BEHAVIORAL WEIGHT LOSS PROGRAM

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BACKGROUND: Behavioral weight loss program participants less likely to lose weight include persons who are an ethnic minority, have lower income, or lower-literacy skills. Other than demographic factors, reliable predictors of response to behavioral weight loss interventions are not well understood. Our team developed the STRIDES weight loss program: a free 12-week group weight loss program with materials at a 4th grade reading level. STRIDES stands for Steps to Reach Individual Diet and Exercise Solutions. STRIDES includes interactive group learning and individual counseling. STRIDES participants are obese African America (AA) women recruited from an urban primary care practice. Not compensated for attendance, 35 % of participants complete the 12-week program on average. Prior STRIDES program analysis showed disease burden, and insurance type were not predictive of attendance or weight loss among these AA women. The primary purpose of this evaluation was to assess among this demographically similar group, other predictors of attendance and weight loss (behavioral, motivational, physical and mood symptom).

METHODS: This program outcome evaluation analyzed participant survey data collected from STRIDES participants from 2011 to 2013 at program entry. The paper survey data

were entered in a secure Research Electronic Data Capture (REDCap) database. Survey measures include: readiness to change, current behaviors, mood and physical symptoms, fatigue, sleepiness, anger, Self-regulation competency (SRC), and environmental factors. These data were compared to STRIDES program participant data from program records (weight and attendance), and demographics and disease burden (electronic medical record). Data analyses. For two-category independent variables the Cochran-Armitage Trend Test was used to assess the trend in binomial proportions across levels of weight change (gain or loss categories). Similarly, this test was used to assess the trend across levels of attendance. Where the independent variables are more than two categories such as multi-categorical survey items with no inherent the Kruskal-Wallis test was used.

RESULTS: The surveys of 92 participants were analyzed. These participants represent a 70 % subset of 130 individuals attending an initial class from 2011 to 2013. (similar data from other participants collected electronically was unusable) This subset did not differ from the overall group in demographics, medical burden, attendance patterns and weight loss. Participants were AA women with an average age of 53 years and body mass index (BMI) of 43. Hypertension was present in 65 % and diabetes in 35 %. **Participant attendance:** 33 % dropped-out, 33 % partial completion, 34 % completion. **Participant Weight loss:** for completers ($n=34$) was 78 %, and 52 % lost 5 % or more. **Predictors of Attendance and Weight Loss.** Measures of Baseline diet or exercise habits, home environment, lifestyle and readiness to change eating and activity did not predict program completion or weight loss. Overall sleepiness and fatigue scale scores were not predictive, but those reporting headache with exercise were less likely to complete STRIDES ($p=0.004$) and trended to decreased weight loss ($p=0.0642$). Using the binomial PRIME MD utility, participants reporting ≥ 3 symptoms had less attendance and weight loss. ($p=0.0372$ and 0.0067 , respectively). Higher self-rating on SRC items to take initiative to solve a problem and to stick to a decision were significantly associated with weight loss ($p=0.0475$ and 0.0347 , respectively).

CONCLUSIONS: The STRIDES behavioral weight loss program is variably effective in obese African American urban women from a low income area. This variation is typical among behavioral weight loss programs. Poorer attendance and weight loss were correlated with pre-enrollment exercise-related headache and higher levels of overall physical and mood symptoms. Increased weight loss and program completion were associated with increased self-rated competency for problem solving and persistence. This suggests two areas of study to optimize weight loss results for participants in behavioral weight loss programs. First is assessing whether pre-program assessment and optimization of physical and mood symptoms may improve outcomes. Second, is the testing whether STRIDES program participation changes self-regulation competency skills like for initiating and persisting in personal change efforts. Broader assessments of factors predictive of success among persons with varied characteristics is also needed to optimize resource use and of success rates for participants of behavioral weight loss programs like STRIDES to achieve and maintain clinically meaningful weight loss.

WHY AREN'T MORE PRIMARY CARE RESIDENTS GOING INTO PRIMARY CARE? STUDYING PROGRAM FACTORS THROUGH QUALITATIVE INTERVIEWS WITH PRIMARY CARE RESIDENTS Theodore Long³; Krisda H. Chaiyachati¹; Olatunde Bosu¹; Sohini Sircar⁴; Bradley G. Richards²; Leslie Curry⁴; John P. Moriarty³; Stephen J. Huot³. ¹Yale School of Medicine, New Haven, CT; ²Yale University, New Haven, CT; ³Yale University School of Medicine, New Haven, CT; ⁴Yale School of Public Health, New Haven, CT. (Tracking ID #2192800)

BACKGROUND: Workforce projections indicate a potential shortage of up to 44,000 adult primary care providers by the year 2025. Nearly two-thirds of primary care internal medicine residents do not plan to have a career in primary care or general internal medicine. Previous studies have examined individual level factors such as debt burden as reasons for not choosing primary care careers. However, it remains largely unknown whether residency training environments influence such decisions. We explore contextual and programmatic factors within primary care residency training environments that may influence career choices.

METHODS: Qualitative study based on in-depth, in-person interviews. Three primary care internal medicine residency programs were purposefully selected to achieve diversity on key features in the training environments: exposure to academic general internal medicine faculty and fellowship opportunities, ambulatory training structures, and percentage of graduates retained in primary care. Second and third year residents were interviewed. We used an instrument developed from pilot interviews and existing literature. Three members of the research team independently coded the transcripts and then met to resolve differences. The code structure was developed in stages based on the constant comparative method, using a systematic and inductive approach to generate insights from the comments of the study participants. The research team identified emerging themes and refined codes. We used ATLAS.ti to facilitate data organization and retrieval.

RESULTS: We completed twenty-four interviews (twelve second year residents, and twelve third year residents). The age range was 27–39. Fifteen residents expressed

intentions to pursue a career in primary care. Four recurrent themes characterize contextual and programmatic factors as facilitators and barriers to a decision to continue in primary care. First, residents described cultural features of their training program, including strong mentorship as a key support and lack of prestige in primary care as a negative influence. Second, structural features of the training program included protected time as a supportive mechanism and lack of diversity in outpatient experiences as a constraint. Third, residents described challenges with navigating the health and social care boundary for primary care patients. Fourth, residents reflected on lack of alignment between their pre-residency expectations and the actual practice of primary care.

CONCLUSIONS: Residents enrolled in primary care programs identify experiences in training that may act as facilitators or barriers impacting their decision to enter into a career in primary care. Addressing aspects of training that are potential barriers (such as a lack of diversity in outpatient experiences and resident frustration with their inability to address social needs of patients) and strengthening those aspects of training that may act as facilitators (such as mentorship and protected time away from inpatient responsibilities during primary care rotations) may increase the proportion of residents enrolled in primary care training programs who pursue a career in primary care.

WHY DO EMPLOYERS OFFER WELLNESS PROGRAMS AND HOW DO THEY MEASURE SUCCESS? Joyce W. Tang¹; Margaret R. Moran¹; Pamela Allweiss²; Ronald T. Ackermann¹. ¹Northwestern University, Chicago, IL; ²Centers for Disease Control and Prevention, Atlanta, GA. (Tracking ID #2196109)

BACKGROUND: Workplace wellness programs are an important, but underutilized resource for primary care providers to consider when counseling patients for behavior change. Workplace wellness is a 6 billion dollar industry, with more than half of employers with 50 or more employees offering wellness programs. While cost savings has often been cited as an important reason for offering wellness programs, recent studies have raised questions about the ability of these programs to demonstrate significant cost savings. We sought to conduct an in-depth exploration of employers at the leading edge of the wellness movement to understand their motivations for offering wellness programs and metrics for evaluating success.

METHODS: We used several approaches to identify a diverse array of employers and vendors who are recognized by their peers as leaders in the wellness arena: 1) reviewed lists of recipients of national awards for wellness; and 2) solicited referrals from occupational medicine professional societies, wellness industry organization leaders, and interview participants. We conducted semi-structured interviews with senior leaders from each firm or their vendor partner who were knowledgeable about the firm's wellness strategy and activities. Participants completed a 1 h phone interview. Open-ended questions were used to elicit motivations for offering wellness programs and metrics for success. All interviews were digitally recorded and transcribed. We applied template analysis to code and organize themes. Two investigators reviewed all transcripts and agreed on an initial template. Subsequently, two investigators independently applied the hierarchical template to a set of eight interviews, using NVivo 9 to organize the data. After coding consensus was achieved, a single investigator coded the remaining 16 interviews. The study team worked together to finalize the thematic template.

RESULTS: Our sample included 20 employers and 3 vendors, with representation across 7 industries (mainly manufacturing, education, and healthcare) and all 4 geographic regions of the U.S. The employers ranged in size from 600 to 170,000 employees, with a median size of 17,000. Interviewees included Chief Medical Officers and Wellness Program Directors from employer sites; and Medical Directors at vendor sites. Virtually all participants described wellness under the larger umbrella of health management strategy, which encompasses both disease management and health promotion. Manufacturing companies often described an alignment between their wellness and safety initiatives. Health management programs were viewed as integral to the business strategy due to ability to increase productivity, decrease indirect costs (disability), and contain medical expenditures. Main metrics for success included high employee participation rates, improvement in clinical outcomes (i.e., shift toward a lower employee health risk profile, as measured via health risk assessment and biometric data), and a bend in the overall cost trend. While many employers measured return on investment (ROI) and felt it to be important in demonstrating value to senior leadership, virtually all agreed that it was both challenging to accurately assess and inherently limited in its ability to capture the true benefits of wellness programs (e.g., engagement, productivity).

CONCLUSIONS: Employers approach wellness and disease management under the umbrella entity of health management strategy. Main metrics used to evaluate success (cost trend, shift in employee health risk profile) are aligned with primary motivations for offering wellness programs (decrease cost, improve health). Given that healthcare providers and employers share the goal of improving population health, efforts to better coordinate these efforts should be encouraged.

WHY MEN GET OR DON'T GET TREATED FOR LOCALLY ADVANCED PROSTATE CANCER: PHYSICIANS' PERSPECTIVES Sarah R. Abramson⁵, Jenny J. Lin¹, Ann S. McAlearney⁴, Kezhen Fei², Rebecca Franco³, Nina A. Bickell³. ¹Mount Sinai, New York, NY; ²Mount Sinai School of Medical, New York, NY; ³Mount Sinai School of Medicine, New York, NY; ⁴The Ohio State University, Columbus, OH; ⁵Icahn School of Medicine at Mount Sinai, New York, NY. (Tracking ID #2196281)

BACKGROUND: Locally advanced prostate cancer treatment can improve survival. Yet, black are more likely than white prostate cancer patients to go untreated. We found that 13 % of black and 1 % of white men (25 of 641 men with Gleason Scores ≥ 7 diagnosed at an academic or a municipal inner-city hospital between 2006 and 2013) did not get definitive treatment. We undertook this study to describe physician reasons for treatment recommendation or underuse of definitive surgical, radiation or cryotherapy treatment.

METHODS: We interviewed 15 physicians treating 23/25 underuse patients; 2 physicians were unreachable. Interview summaries were reviewed and analyzed using a grounded theory approach.

RESULTS: Physician and patient factors influencing treatment recommendation and decision-making include: patient biological (age, life expectancy, comorbidities, tumor histology) and social characteristics (treatment logistics, patient lifestyle); physician specialty and financial incentives - 36 % of physicians described reimbursement incentivizing radiation. Among underuse patients, treatment was recommended but not received in 95 % (20/21) of men and was not recommended due to small tumor size in 5 % (1/21). Among men for whom treatment was recommended, 1 went untreated due to inability to afford ADT, 4 patients refused treatment, and the majority (71 %) (15/21) were system failures. Eighty-seven percent of system failures were lost to Urology follow up, yet a quarter of these men had subsequent visits at the hospital. Thirteen percent of system failures were lost "within" treatment- ADT was begun but planned primary treatment never ensued as medical workups proceeded.

CONCLUSIONS: For the vast majority of underuse, treatment is recommended but does not ensue due to loss to follow-up. As significant numbers of men continue to receive care at the treating hospital, there is ample missed opportunity to redress underuse and reduce racial disparities in cancer care. Financial incentives that influence treatment decisions have the potential to increase costs of care.

WILL YOU BE MY FRIEND?: A NATIONWIDE SURVEY OF PRIMARY CARE PATIENTS' ATTITUDES TOWARDS USE OF SOCIAL MEDIA FOR CONNECTING WITH PROVIDERS Priyanka Agarwal⁴, James Colbert³, Joy L. Lee², Katherine C. Chretien⁵, Lisa S. Lehmann¹. ¹Brigham and Women's Hospital, Boston, MA; ²Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; ³Newton-Wellesley Hospital, Newton, MA; ⁴University of California, San Francisco, San Francisco, CA; ⁵Washington DC VAMC, Washington, DC. (Tracking ID #2196286)

BACKGROUND: Although many individuals communicate electronically with text messaging and social media sites such as Facebook, little is known about how they would like to use these tools to interact with physicians. Physicians themselves have little guidance about how to appropriately engage patients on these electronic platforms. This study is the first multi-site survey of primary care patients to assess how patients would like to interact with providers on social media sites, and more broadly assess their preferences for electronic provider communication.

METHODS: A cross-sectional survey study was conducted with patients at four academic primary care outpatient clinics in three US cities. Paper surveys were distributed in waiting rooms to English-speaking patients, and patients were asked about modes and preferences for communication with their primary care physician (PCP). Demographics including age, gender, education, race, and health status were collected. We analyzed the relationship between demographics and electronic communication preferences using descriptive statistics and multivariate logistic regression.

RESULTS: The survey was completed by 491 patients with a response rate of 86 %, recorded at three of the four sites. A response rate could not be calculated for the fourth site (representing 21.2 % of all respondents). Amongst all respondents, 69 % reported using at least one social media site with Facebook being the most popular site (85 % of social media users). Regarding current methods of communicating with their PCP, 64 % of patients use telephone, 47 % mail, 28 % email, 26 % a web portal, 3 % text messaging, and 0.5 % use social media sites. When asked how they would like to communicate with their PCP, 37 % of patients reported interest in using text messaging, 27 % in using an interactive website (e.g. web portal), and 11.1 % reported interest in using Facebook. Respondents who use social media were four times more likely to want to communicate with their PCP using an interactive website to communicate with their PCP (OR 3.9, $p < 0.001$) and were twice as likely to want to use texting to communicate with their PCP (OR 1.9, $P = 0.02$). Multivariate regression analysis found those who were more frequent users of Facebook would like to use Facebook to communicate with their PCP (OR 3.4 $p =$

0.01). In regards to how social media users engage with providers, among Facebook users, only 3 % are currently friends with their primary care physician (PCP), though 26 % of Facebook users reported interest in wanting to be Facebook friends with their PCP (Table 1). Multivariate regression analysis found that gender, education, race, ethnicity and health status did not significantly affect the desire to be Facebook friends with one's PCP. Age, however, did significantly impact the desire to be Facebook friends with one's PCP: Compared with patients aged 18–34, those aged 35–49 were about half as likely to want to be friends with their PCP (OR 0.45, $p = 0.04$), while those aged 65 and over were five times less likely (OR 0.19, $p < 0.001$). Patients using Facebook most days, relative to those using Facebook a few times a month, were three times as likely to want to be friends with their PCP (OR 3, $p = 0.006$).

CONCLUSIONS: While phone and mail are currently the most commonly used means for PCP communication, large percentages of patients would like to use an interactive website or text messaging to communicate with their PCP, and a smaller percentage would like to use Facebook. A majority of primary care patients in our sample use social media, and more engaged social media users were more likely to want to use an interactive web site, text messaging, or Facebook to communicate with their PCPs. If current trends of increased social media use continue, these data suggest that providers and healthcare systems should consider additional electronic means of communicating with their patients and develop unique ways of leveraging web portals, text messaging, and social media. Challenges with privacy and HIPAA will need particular attention on the part of providers. Although few individuals currently are connected through a social media site to their PCP, over a quarter of primary care patients in our sample who use Facebook were interested in establishing a connection to their PCP over social media, and those who were younger and use social media more frequently were more likely to desire such a connection with their PCP. PCPs may want to consider an increased presence on social media sites as a means of communicating information to their patients.

Current & desired 'Friending' of Providers by Primary Care Patients who use Facebook

	Number of patients who would like to be Facebook friends w/the following (%)	Number of patients who would like to be Facebook friends w/the following (%)
PCP	7 (3 %)	74 (26 %)
Other Physician	8 (3 %)	0 (0 %)
Nurse	5 (2 %)	43 (15 %)
Social Worker	5 (2 %)	23 (8 %)
Clinic Staff	5 (2 %)	29 (10 %)

WOMEN VETERANS WITH CO-OCCURRING MENTAL HEALTH CONDITIONS IN VA PRIMARY CARE CLINICS: A MIXED METHODS STUDY Alison B. Hamilton^{2,6}, Natalya Maisel⁵, Elizabeth M. Yano¹, Ruth Klap², Sabine Oishi², Vidhya Balasubramanian³, Fay Saechao⁴, Susan M. Frayne³. ¹VA Greater Los Angeles HSR&D Center, Sepulveda, CA; ²VA Greater Los Angeles Healthcare System, Los Angeles, CA; ³VA Palo Alto Health Care System/Stanford, Menlo Park, CA; ⁴VAPAHCs, Menlo Park, CA; ⁵Veterans Affairs Palo Alto Health Care System, Menlo Park, CA; ⁶University of California Los Angeles, Los Angeles, CA. (Tracking ID #2197845)

BACKGROUND: Co-occurring mental health (MH) conditions are prevalent in the US population and among Veterans. Little is known, however, about providers' perceptions of and experiences with primary care patients who have co-occurring MH conditions. To address this gap in knowledge, we focused on frontline providers' qualitative experiences of caring for women Veterans (WVs) in VHA women's health primary care clinics. Then, to substantiate providers' perceptions of WV MH needs, we analyzed administrative data to ascertain the prevalence of co-occurring MH conditions among these patients, and to examine their MH service utilization.

METHODS: Qualitative component: We conducted semi-structured interviews in fiscal years (FY) 2011 and 2012 with frontline women's health (WH) primary care and MH providers and staff ($n = 96$) from six VA healthcare systems, who described the main MH needs of WVs in their clinics. Quantitative component: We analyzed VHA administrative data for 313,029 FY12 WV VHA primary care patients nationwide, to ascertain the frequency of co-occurring MH diagnoses by mapping ICD-9 diagnosis codes to 16 MH conditions, and to examine MH utilization patterns by number of MH conditions.

RESULTS: Interview respondents pervasively observed that WVs' health, and particularly MH needs were typically "complex," with co-occurring MH conditions alongside psychosocial stressors that complicated the ways in which WVs utilized healthcare services. Participants perceived strong connections between women's trauma histories and eating and sleep disorders, family and relationship difficulties, unemployment, and

housing instability. Providers emphasized the challenges of meeting the needs and coordinating the care of WVs with physical health conditions as well as co-occurring MH conditions, psychosocial stressors, and trauma histories. In particular, providers were challenged by women's inconsistent use of health care (often due to their life stressors), which made it difficult to develop and maintain comprehensive, integrated care and innovative programming. Among 313,029 FY12 WV VHA primary care patients, 48 % had at least one MH condition. Twenty-seven percent of WVs had two or more conditions. The top five MH conditions were Depression (34 %), Anxiety Disorder (17 %), PTSD (16 %), Bipolar Disorder (6 %), and Alcohol Use Disorder (5 %). The most common MH co-occurrences among these patients were PTSD/Depression (11 %) and Anxiety Disorder/Depression (11 %). Among those with two or more MH conditions, 82 % had Depression, and 51 % had PTSD. Among those with one MH condition, 47 % had no MH encounters and 38 % had two or more encounters in FY12; among those with two or more MH conditions, 9 % had no MH encounters and 82 % had two or more encounters in FY12.

CONCLUSIONS: More than one-quarter of WV VHA primary care patients had two or more MH conditions, a finding that is consistent with providers' perceptions that many WVs in VA women's health primary care are "complex" in their healthcare needs. Depression was a prominent MH condition among these primary care patients, as was PTSD particularly among those with two or more MH conditions. Women with two or more MH conditions were utilizing MH services, but almost half of women with one MH condition were not utilizing MH services. WV primary care providers may be especially challenged with prioritizing and coordinating the diverse services needed to address women's physical, MH, and psychosocial needs. With the population of WV VHA users increasing, the system will need to generate innovative ways to address service needs of WVs and their varying degrees of engagement in care.

WOMEN'S AWARENESS OF THEIR CONTRACEPTIVE BENEFITS AFTER THE AFFORDABLE CARE ACT Cynthia H. Chuang¹; Julie Mitchell¹; Diana Velott³; Christopher Sciamanna²; Richard Legro¹; Erik B. Lehman⁴; Lindsay Confer⁴; Carol S. Weisman¹. ¹Penn State College of Medicine, Hershey, PA; ²Penn State Hershey, Hershey, PA; ³Penn State Hershey College of Medicine, Hershey, PA; ⁴Pennsylvania State University, Hershey, PA. (Tracking ID #2199328)

BACKGROUND: The Affordable Care Act (ACA) of 2010 eliminates the cost barrier to contraception for most women with private health insurance by mandating no out-of-pocket cost for FDA-approved contraceptive methods, including long-acting reversible contraceptives (LARCs)—intrauterine devices (IUDs) and contraceptive implants—which are the most expensive and effective reversible methods. However, whether privately insured women are aware of their newly expanded contraceptive benefits is unknown.

METHODS: We report baseline data from the MyNewOptions study, an ongoing randomized controlled trial of an online intervention to assist adult women make informed contraceptive decisions. The sample includes 989 female Highmark Blue Shield members in Pennsylvania between the ages of 18–40. After confirming eligibility (sexually active, not intending pregnancy in the next 12 months, not surgically sterile or having a partner with vasectomy, having Internet access and a valid email address), participants completed a baseline survey including assessment of pregnancy history, contraceptive history, and awareness of contraceptive coverage benefits [To the best of your knowledge, does your health insurance policy CURRENTLY cover these birth control methods at no cost to you (no copay or deductible payment)?—tubal sterilization ("tubes tied"), birth control pills, IUD].

RESULTS: Less than 5 % of women were aware that their insurance covers tubal sterilization, and less than 12 % were aware that they have full coverage for the IUD. Most women (58 %) were aware they have full coverage for birth control pills. Nearly one in five women reported they would change methods if they did not have to worry about cost, of whom 30 % would switch to an IUD and 9 % would switch to the contraceptive implant. Nearly half of the sample (48 %) were possible candidates for LARCs because they were either not intending any future pregnancy or not intending a pregnancy for at least 5 years, but less than 9 % were currently using a LARC.

CONCLUSIONS: We report that privately-insured women in the MyNewOptions study are largely unaware of their expanded contraceptive benefits under the ACA, including coverage for LARCs. For the ACA contraceptive coverage mandate to impact use of effective contraception, raising women's awareness of the expanded benefit is an essential first step. Private insurers, health care providers, and policymakers will need to better communicate the benefit or this could be a missed opportunity to reduce unintended pregnancy among U.S. women.

WORKING AT HOME: RESULTS FROM A NATIONAL, MULTI-CENTER SURVEY OF INTERNAL MEDICINE AND GENERAL SURGERY RESIDENTS

Lisa S. Lehmann^{1,3}; Frances Javier²; Matthew Erlendson²; Laura Skirp²; Mark Mercurio²; Kimberly Davis²; Carrie Thiessen². ¹Brigham and Women's Hospital, Boston, MA; ²Yale School of Medicine, New Haven, CT; ³Harvard Medical School, Boston, MA. (Tracking ID #2198976)

BACKGROUND: With the spread of electronic medical records, residents have increasing opportunities to do patient care work at home. ACGME guidance specifies that patient work at home should count toward the resident hour limits. This study evaluated the amount and type of patient care work residents report performing at home, and why they do so.

METHODS: Residents at 26 internal medicine and general surgery residency programs were invited to take an anonymous online survey about work at home and duty hours. Programs were selected to represent a range of geographic location, size, and academic status. The survey was administered in May and June 2014. When answering questions about work at home, residents were instructed to think only about patient care and to exclude time spent "studying, preparing for presentations, or doing research." Our results were analyzed with standard descriptive statistics in SAS 9.3. We used multivariate logistic regression to determine if demographic variables including specialty and training level were associated with reporting working at home.

RESULTS: Of 1591 contacted residents, 535 completed the survey (response rate 34 %). Sixty percent of all respondents were men, 60 % were Caucasian, 56 % were <30 years old, and 42 % were general surgery residents. Respondent level included PGY1 (38 %), PGY2 (28 %), PGY3 (22 %), and PGY4-5 and research years (12 %). Most residents reported performing patient care work at home, but did not count this toward their duty hours (88 %). Residents worked at home an average of 1–2 h (35 %), 2–5 h (36 %), 5–10 h (14 %), or >10 h (4 %) per week. Work at home included: checking lab and results (92 %), reading charts to prepare for a new rotation (87 %), reviewing patient vitals (75 %), and talking to other residents or attendings (72 %). Surgery residents also frequently reviewed charts for upcoming cases (94 %) and completed operative reports (65 %). Curiosity about patient outcomes (78 %), desire to leave the hospital (74 %), comfort (66 %), and increased time with family (61 %) were the most important reasons for working at home. Thirty percent of residents explicitly did work at home to avoid counting it as duty hours. On univariate and multivariate analysis there was no significant relationship between gender, age, race, specialty, or level and likelihood of reporting working at home.

CONCLUSIONS: Electronic medical records allow the majority of residents to shift some patient care work from the hospital to home. Most residents in our study reported not recording this time as duty hours despite ACGME guidance to the contrary. Our results indicate that residents' sense of responsibility for their patients continues after they leave the hospital, perhaps mitigating concerns about a "shift-work mentality." Given the prevalence of work at home, further research should assess its impact on patient care, resident education, and quality of life.

WORKPLACE WELLNESS INCENTIVES FOR WEIGHT LOSS—A RANDOMIZED, CONTROLLED TRIAL Mitesh Patel^{1,2}; David A. Asch^{1,2}; Andrea B. Troxel¹; Lisa Wesby¹; Victoria Ulrich¹; Jingsan Zhu¹; Wenli Wang¹; Kevin G. Volpp^{1,2}. ¹University of Pennsylvania, Philadelphia, PA; ²Philadelphia VA Medical Center, Philadelphia, PA. (Tracking ID #2196639)

BACKGROUND: More than one-third of adults in the United States are obese. The Affordable Care Act significantly increased the proportion of health benefit premiums available for outcome-based wellness incentives. However, there is little evidence about the effectiveness of longer term wellness incentives to guide the design of health benefit incentive plans for weight loss. The objective of this study was to evaluate the effectiveness of a commonly used approach to employee benefit design (premium adjustment next year) with two alternatives that utilize concepts from behavioral economics.

METHODS: Two hundred employees of a large health system in Philadelphia with a body mass index of 30 or greater were given the goal of losing 5 % of their body weight within 12 months and randomized to control or one of 3 intervention arms: a "standard" arm in which the employee would get \$550 off next year's benefit premiums if goal was met, an "immediate gratification" arm in which the employee would receive \$550 in reductions in their benefit premiums starting as soon as their goal was met, or a daily lottery arm in which each employee had an 18 % chance of winning \$10 and a 1 % chance of winning \$100 each day at work that their weight was below a gradual decline to 5 % weight loss by 6 months and that they maintained their weight goal in the subsequent 6 months. The intervention was designed to simulate a real-world workplace wellness incentive. Scales were placed within the workplace. Participants were allowed to use the scales at any time but only required to weigh in at 6 and 12 months. No other resources or feedback was provided other than informing participants of financial incentives. The

primary outcome measure was mean weight loss by arm at 12 months. The secondary outcome measure was the proportion of employees that met the 5 % weight loss target by 12 months and mean weight loss at 6 months.

RESULTS: Employees in the study sample had a mean body mass index of 36.9 (standard deviation [SD]: 5.3), mean weight of 227.1 lb (SD: 37.6), mean age of 44.9 (standard deviation: 9.8), and were 81.7 % female. At 12 months the mean weight loss for the control arm was -1.53 lbs. (95 % Confidence Interval [CI]: -5.34-2.27) and there were no significant differences compared to the standard incentive arm (Mean: -1.25, 95 % CI: -4.89-2.39, $P=0.92$), the immediate gratification incentive arm (Mean: -0.91, 95 % CI: -5.30-3.48, $P=0.82$), or the daily lottery incentive arm (Mean: -1.39, 95 % CI: -5.12-2.34, $P=0.96$). Mean weight loss at 6 months was similar among the arms. There were no significant differences in probability of achieving the 5 % weight loss goal during the 12 month period for the control arm (20.0 %, 95 % CI: 11.1 %-33.3 %), the standard incentive arm (22.5 %, 95 % CI: 12.9 %-36.2 %, $P=0.77$), the immediate gratification incentive arm (12.5 %, 95 % CI: 5.7 %-25.2 %, $P=0.32$), or the daily lottery incentive arm (20 %, 95 % CI: 11.1 %-33.3 %, $P=1.00$)

CONCLUSIONS: Workplace wellness programs designed to simulate real-world incentives through discounts in health premiums were not effective for promoting weight loss over an extended one year period. A daily lottery incentive unbundled from health premiums was also not effective for promoting weight loss over a one year period. Wellness programs using financial incentives for weight loss need further evaluation and may need to be launched in combination with other engagement strategies.

YOU CAN'T IMPROVE WHAT YOU DON'T MEASURE: A SYSTEMS ENGINEERING APPROACH TO DEVELOPING GEOGRAPHICALLY-MATCHED PATIENT-PROVIDER TEAMS Vimal Mishra¹; Heather Masters¹; Allison E. Phillips¹; Richard Storch²; Shin-Ping Tu¹. ¹Virginia Commonwealth University, Richmond, VA; ²University of Washington, Seattle, VA. (Tracking ID #2196164)

BACKGROUND: Effective health care requires a delivery system that is fully coordinated and interconnected, with teams that share a mental model regarding the plan and goals of care. To achieve this requires structured communication between the physicians and nurses who are on the front line of patient care, yet an increasingly recognized barrier to efficient, patient-centered care is the geographic dispersion of these primary team members. A joint report by the Institute of Medicine and the National Academy of Engineering recommends applying systems engineering methodology to the challenges of health care. This utilization of systems engineering and simulation modeling can provide a relatively inexpensive, data-driven alternative to evaluate complex health care issues leading to improved patient care. The purpose of our analysis was to explore the application of systems engineering techniques to more geographically match patients with their Internal Medicine (IM) teams at an urban medical center with a consistent capacity of over 90 %.

METHODS: Using electronic health records (EHR) we retrospectively extracted admission, bed assignment, and discharge data for IM patients from January 1, 2013 to December 31, 2013. Length of stay data was calculated based on the date and time of both admission and discharge. We developed a current state model using SIMIO simulation software, which was then validated for reliability and accuracy. Building on the validated current state model, we constructed our first experimental model to analyze IM patient volume, including those admitted to housestaff teams, in order to evaluate whether the average IM patient volume could be accommodated by a smaller number of nursing units. The housestaff service currently has five teams each with a capacity of 16 patients, resulting in a total capacity of 80. Three nursing units of interest were identified; each specializing in the care of IM patients with a total bed capacity of 81. The first experimental model was executed for one year and associated metrics were analyzed. Subsequently, 50 iterations of this experimental model were then performed in an effort to decrease variance and error. Building on the first experimental model, a second experimental model was constructed with the inclusion of the following variables: 1) level of patient acuity and 2) bed type. These were of particular interest due to patients' differential utilization of beds and resources depending on the severity of their illness. A node algorithm was created to admit patients to the units with the lowest census, as well as randomly selecting IM housestaff teams to ensure patients were distributed equally. Methods and analyses utilized for the first experimental model were then replicated for the second experimental model.

RESULTS: The first experimental model generated 3953 admissions (the same as original EHR admissions) and these patients were distributed to each of the three units. This model resulted in an average house staff team census of 11.57 (raw EHR data=12.00) with an average of 71 % utilization of patient load capacity for the unit (EHR derived est=72 %) and 72 % housestaff team utilization of patient load capacity. Additionally, the average number of patients across all three units was reported to be 62 with an average of 19 patients per unit. For the second experimental model, analysis of the dataset revealed two different types of patients - those requiring step-down beds and those requiring general

medicine beds. The three units used in our first experimental model had a total of 46 general beds and 35 step-down beds. The proportion of patients admitted to these two types of beds was derived from the EHR and was determined to be 76.5 to 23.5 %, respectively. The second experimental model was then simulated with the inclusion of these parameters. The results showed a general bed utilization of 96 % compared to the step-down bed utilization of 39 %. This bed mismatch increased the average length of stay for general medicine patients to 171 h as compared to 127 h for step-down patients. It also led to increased numbers of patients in the system to 71.

CONCLUSIONS: As exemplified by our analyses and results, simulation and the principles of systems engineering can provide us with a scientific and data-driven method with which to evaluate complex hospital operations processes, which may aid critical decision-making affecting system performance ultimately influencing the ability to provide equitable and quality care. For instance, based on the 2013 admissions data and our first model, we were able to successfully establish the feasibility of admitting all housestaff patients to only 3 units instead of the current practice of 17 units. Additionally through the second experimental model we were able to highlight a resource and demand misalignment that exists on those three units.

*CLINICAL VIGNETTES

A CASE OF POST-CHIKUNGUNYA INFLAMMATORY ARTHRITIS Michael J. Lau; Isabel Preeshagul; Sudha Dubey. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2198967)

LEARNING OBJECTIVE #1: Recognize the presentation and complications associated with chikungunya virus infection

LEARNING OBJECTIVE #2: Manage post-chikungunya inflammatory arthritis

CASE: A 51 year-old woman presented for 3 weeks of hand and foot pain and swelling after returning from a trip to Puerto Rico 3 weeks prior. For the same duration she also noted a rash on her face and arms with subjective fevers, both of which had begun to improve. On exam, she had minimal cervical lymphadenopathy, a faint reticular erythematous rash on both arms including the palms, and mild swelling and tenderness of the proximal and distal interphalangeal joints of her hands and feet. She had normal conjunctivae, her lungs were clear to auscultation, her cardiac exam was normal, and her abdominal exam revealed no hepatosplenomegaly. Labs revealed a normal hemoglobin, white cell count and differential, platelet count, as well as normal transaminase levels and a creatinine of 0.6 mg/dL. Serology revealed positive IgM and IgG for chikungunya virus and negative antibodies for dengue. She was started on a 5-day course of oral prednisone and standing doses of NSAIDs. Her rash and fevers resolved completely, however joint pains recurred after discontinuation of prednisone causing significant disability and inability to sleep. She presented for follow-up 7 weeks after the initiation of symptoms with persistent pain. She was started on a twelve-day course with a slow taper of steroids and was referred to a rheumatologist. Labs on steroids revealed no elevation in sedimentation rate or C-reactive protein, and hand and foot x-rays revealed normal joint spaces. Based on her clinical presentation she was diagnosed with post-chikungunya inflammatory arthritis. She was started on sulfasalazine in addition to the steroid taper. Recurrence of symptoms after she completed steroids required re-addition of a smaller dose of prednisone (2.5 mg daily) in addition to sulfasalazine. On this combination she has had significant improvement of her joint pains.

DISCUSSION: Chikungunya is an arbovirus endemic to west Africa and south and southeast Asia and is transmitted by mosquitoes belonging to the *Aedes* genus. In the late 1990's, the virus' range began to extend to islands in the Indian Ocean, Europe, and more recently to parts of North, Central and South America. The name is derived from a Swahili term meaning "to be bent over," a reference to the debilitating arthralgias associated with the disease. Initial presentation is associated with high fevers, rash, and severe arthralgias most commonly involving the hands, wrists, and ankles. Lab findings commonly include lymphopenia or thrombocytopenia, and increased creatinine and transaminases. While the symptoms are typically self-limited and resolve within 7-10 days, some patients suffer from persistent or worsening arthralgias for months to years after initial presentation. This can be associated with an elevation in serum sedimentation rate or C-reactive protein. It is currently unclear what percentage of patients have symptoms that persist for a longer time. There is no specific treatment for chikungunya virus, and therapy consists mainly of supportive care and anti-inflammatory medication including NSAIDs and corticosteroids. There are currently no anti-viral medications or vaccinations that have proven to be effective. Management also involves ruling out other diseases with a similar presentation, particularly dengue hemorrhagic fever, which can sometimes present as a co-infection and lead to serious complications. Patients with a prolonged duration of arthralgias after chikungunya infection, particularly those with elevated serum inflammatory markers suggesting an inflammatory arthritis, may benefit from treatment with disease modifying anti-rheumatic drugs (DMARDs) including methotrexate or sulfasalazine. Use of DMARDs in this situation is based on expert opinion and several small trials which have

suggested a benefit. In the particular case described here, sulfasalazine and corticosteroids have led to an improvement in the patient's symptoms. In 2014, 3833 cases of chikungunya infection were reported in Puerto Rico and 2021 in the U.S. Of the U.S. cases over 98 % occurred in travelers returning from Central or South America or the Caribbean, while 11 cases in Florida were thought to be due to local transmission. As the number of infected patients in the U.S. returning from travel to Puerto Rico, the Caribbean, or South America is expected to increase, it is imperative for clinicians to be aware of the clinical presentation and management considerations for chikungunya infection and its complications.

A CASE OF ELUSIVE PORTAL VEIN THROMBUS: THE DEVIL IS IN THE DETAIL. Jason M. Duran¹; Yevgeniy Brailovsky²; Jihoon Baang¹. ¹Temple University School of Medicine, Philadelphia, PA; ²Temple University Hospital, Philadelphia, PA. (Tracking ID #2180728)

LEARNING OBJECTIVE #1: Recognize idiopathic portal vein thrombosis and know the clinical and radiological findings that may mimic a gastrointestinal malignancy.

LEARNING OBJECTIVE #2: Recognize the importance of discussing radiologic studies with a radiologist, especially when confronted with a diagnostic dilemma.

CASE: A 57-year-old Caucasian woman presented with abdominal pain, and 1 week of diarrhea. The patient was found to have a fever of 102, mild abdominal distention and tenderness but an otherwise normal exam. She was mildly anemic with significant leukocytosis. She had a recent history of recurrent *Clostridium difficile* colitis after taking ciprofloxacin for a urinary tract infection. Upon admission she was found to have a urinary tract infection and a relapse of her *clostridium difficile* colitis. She was treated with appropriate antibiotics but her abdominal pain persisted. A CT abdomen with contrast was performed which revealed a mass-like lesion in the colon "concerning for metastatic colon cancer", hepatic lesions, moderate amount of ascites, thrombus in the portal and intrahepatic vein and a "heterogenous mass" in the pancreatic head. Suspicion for malignancy was high and the thrombus was thought to be secondary to this malignancy. An aggressive GI work up including a colonoscopy, diagnostic paracentesis, upper GI endoscopy with biopsy of a nodular lesion in the duodenum and endoscopic ultrasound were performed, and all were negative for any significant findings. The pathology of the biopsied tissue was benign in nature. The patient's confusing picture prompted the primary team to discuss the CT findings with a hepatobiliary-imaging specialist that was not involved in the original radiologic readings. It was noted that the pancreatic duct was still intact, making malignancy very unlikely since this would cause destruction of the pancreatic duct. It was concluded that the stranding and "heterogenous mass" noted on the CT scan were secondary changes originating from the portal vein thrombosis. The patient was started on anticoagulation and was discharged with significant resolution of her symptoms.

DISCUSSION: Acute portal vein thrombosis is a condition not infrequently encountered in the hospital. It is being diagnosed more frequently mainly due to the wide availability of ultrasound doppler devices. The clinical presentation of acute portal vein thrombosis is broad and can be easily confused with other conditions that may have similar presentations. Radiologic findings can mimic cholangiocarcinoma or a pancreatic head mass. In our case there were many "red herrings" that guided the team and consultants towards a diagnosis of a GI malignancy. The key element in coming up with the diagnosis was an additional review of our imaging study with a radiologist, also known as radiology rounds. Concerns have been raised regarding the disappearance of traditional radiology rounds, mainly driven by wide spread implementation of PACS and teleradiology, and the impact it may have on diagnostic errors. Our case exemplifies the importance of recognizing the signs and symptoms of portal vein thrombosis, which can mimic GI malignancies, and the significance of traditional radiology rounds, especially when confronted with a diagnostic dilemma.

A CRYPTIC PNEUMONIA IN AN IMMUNOCOMPETENT PATIENT James Higgs; Amanda Fernandes. Baystate Medical Center, Enfield, CT. (Tracking ID #2200179)

LEARNING OBJECTIVE #1: Recognize *Cryptococcus* as a potential source of pneumonia in immunocompetent patients

LEARNING OBJECTIVE #2: Recognize indications for lumbar puncture and treatment of pulmonary *Cryptococcus* in immunocompetent patients

CASE: A 34 year-old Hispanic male with history only significant for juvenile cryptorchidism with prior surgical repair presented with a 1 month history of pleuritic chest pain, fevers, and dyspnea on exertion. On initial presentation, patient was hemodynamically stable and afebrile with exam notable for left lower lung crepitations. Lab work was notable for a WBC of 16,200/mm³ with a differential of 62 % neutrophils, and 7.4 % eosinophils. Chest x-ray showed multiple irregular opacities in the left lung base. The

patient was discharged home that same day with a course of azithromycin for community acquired pneumonia. Given persistent symptoms he returned the following day where CT imaging of his chest showed multiple cavitory and noncavitory lung nodules in the left lower lobe along with left hilar lymphadenopathy. Further workup was negative for urine streptococcus antigen, histoplasmosis antigen and serum *Aspergillus* antibodies. Serum *Cryptococcal* antigen titer was positive at 1:64. Expecterated sputum cultures further revealed *Cryptococcus neoformans* though direct visualization was not possible. Testing for immunocompromised states including HIV and PPD/AFB came back negative. It was decided that a lumbar puncture (LP) would not be performed given lack of neurological symptoms. Patient was discharged on a prolonged course of fluconazole 400 mg daily. Two weeks later, he represented with continued pleuritic chest pain and drenching sweats. He reported only taking 200 mg of fluconazole daily. Patient was afebrile, with a WBC of 11,200/mm³. Repeat CXR demonstrated worsening left lower lobe opacities and he was briefly commenced on vancomycin and piperacillin-tazobactam for concern of potential hospital acquired pneumonia. He also underwent an LP given worsening lung disease which was negative for *Cryptococcal* antigen. It was felt that his chest x-ray finding were consistent with progression of his *Cryptococcal* pneumonia in setting of potentially subtherapeutic fluconazole. Patient was started on 400 mg of fluconazole and after 1 week of improvement was discharged home to complete the remaining course of his treatment.

DISCUSSION: Classically labelled as an opportunistic organism in those with weakened immune systems, *Cryptococcus* can also be associated with lung disease in immunocompetent patients. Most often, patients are asymptomatic and lesions are picked up on radiologic imaging or discovered on lung biopsies for cancer workup. Given the fungus' tropism for the CNS, there is often concern for potential dissemination. Though there is no clear consensus in immunocompetent patients, routine LP is not often indicated given relatively low risk of dissemination to the CNS. However, cases of dissemination have been reported and carry significant mortality. Risks associated with dissemination that may warrant an LP include: weight loss, headache, altered mental status, skin lesions, and serum *Cryptococcal* antigen titer $\geq 1:64$. With mild-moderate respiratory symptoms, isolated *Cryptococcal* pneumonia in immunocompetent patients can be treated with 400 mg per day orally for 6 to 12 months; severe infections should be treated similar to CNS disease with induction therapy with amphotericin B plus flucytosine followed by 12 month consolidation therapy with fluconazole.

A FORTUITOUS FIND IN THE WORK-UP OF A CHRONIC COUGH Irina Kryzhanovskaya. UCSF, San Francisco, CA. (Tracking ID #2199739)

LEARNING OBJECTIVE #1: Review common and an uncommon cause of chronic cough

LEARNING OBJECTIVE #2: Familiarize the internist with a non-tuberculous form of mycobacterium: *M. Fortuitum*.

CASE: A 62 year old Chinese-born woman with history of neurofibromatosis 2 with remote resection of a meningioma reported 1 month of dry cough to her primary care physician. She denied fevers, chills, night sweats, weight loss, difficulty breathing, rhinorrhea, reflux, nausea, vomiting, or chest pain. Additionally, she was planning to volunteer at her grandson's school and needed a PPD checked. As her ROS was unremarkable and physical exam revealed a benign heart, lung, skin, lymph node, head and neck exam with normal vital signs, she was treated symptomatically for a post-tussive syndrome and had the PPD placed. Her PPD was positive and with the continuing cough, a chest x-ray, blood count, and three sputum cultures for AFB were obtained. The chest x-ray and blood count were normal but within a week, one out of three sputum cultures grew a species of mycobacterium. The patient followed up shortly to the primary care clinic noting her cough had significantly improved without any treatment just as the final report for one of three sputum cultures returned with *Mycobacterium fortuitum*. As her imaging was normal, her symptoms resolving, and only one of three AFB cultures positive, she was not prescribed any treatment and recommended to have a non-contrast Chest CT and repeat sputum cultures should her symptoms return.

DISCUSSION: Chronic cough is one of the most common presenting complaints to internists, and awareness of the initial differential diagnosis is imperative. This list includes such causes as medication effect, reflux, post-nasal drip, reactive airway disease, and post-tussive syndrome. Though less common, nontuberculous mycobacterium can also produce a chronic cough. In this case, we present a patient who grew *Mycobacterium Fortuitum* on one of three sputum cultures. *M. Fortuitum* is found in natural and processed water, sewage, and dirt. Most often, this rapidly growing mycobacterium manifests in cutaneous, bone, joint, or ocular infections, with cardiothoracic surgical site skin complications being the most frequent. While immunocompetent hosts rarely develop symptoms (aside from recent reports of cutaneous infections after use of contaminated nail salon footbaths), severe and disseminated disease occurs in severely immunocompromised hosts. With invasive disease, *M. fortuitum* tends to respond favorably to oral antimicrobials such as macrolides and quinolones in combination with IV therapy for a multiple month course. In summary, if initial treatment for some of the more common causes of

chronic cough is not successful, other etiologies such as nontuberculous mycobacterial infection should be considered in the right clinical setting.

A KILLER IN THE CONSERVATORY Patrick A. Proctor²; Thomas Montgomery¹; Robert Sautter¹; James Horton¹. ¹Carolinas Healthcare System, Charlotte, NC; ²Carolinas Medical Center, Charlotte, NC. (Tracking ID #2179932)

LEARNING OBJECTIVE #1: *Scedosporium prolificans* is an emerging and highly lethal cause of culture-negative disseminated infection.

LEARNING OBJECTIVE #2: Almost all cases of disseminated *Scedosporium prolificans* involve immunocompromised hosts.

CASE: A 49 year old man with multiple myeloma presented to the emergency room with chest pain and progressive shortness of breath. He was currently receiving chemotherapy after a bone marrow transplant five months before. His systolic blood pressure was 87 mmHg, heart rate 100, respiratory rate 16, and oxygen saturation 98 % on room air. An S3 heart sound was audible, but there was no murmur. He required ventilatory support within 4 h of admission. An echocardiogram demonstrated severe aortic insufficiency and a large aortic valve vegetation. Two months before, he had been diagnosed with a spinal abscess. Culture of aspirated fluid grew *Scedosporium prolificans* resistant to all tested antifungals, but result was not notified until his presentation at our hospital. Despite reported pan-resistance, we started voriconazole, as this drug has the best evidence for efficacy in cases of *Scedosporium prolificans*. The patient then underwent emergent aortic valve replacement. Massive induration and inflammation of the epicardial fat and soft tissue adjacent to the aortic root was found. Extensive excision and debridement followed, and a bioprosthetic aortic valve was placed. The patient developed complete AV block and ventricular pacing wires were placed. Gram stain of valvular tissue showed pseudohyphae and yeast consistent with *Scedosporium prolificans*. At that time we added terbinafine, Amphotericin B, and caspofungin since there is in vitro evidence of synergy during treatment of *Scedosporium prolificans*. Aortic valve cultures confirmed *Scedosporium prolificans* resistant to all four antifungal agents which were used for treatment. Post-operatively, the patient continued to require intubated ventilation, ventricular pacing, and vasopressors. On hospital day five, the patient's family elected to pursue comfort care, and he expired later that day.

DISCUSSION: *Scedosporium prolificans* is a globally ubiquitous mold found most commonly in soil and water. It is an opportunistic fungal pathogen and an increasingly recognized cause of severe infections among immunocompromised patients. Infection is caused by inhalation of spores or through direct contact with broken skin. The first reported case of *Scedosporium prolificans* infection was in 1984, when an immunocompetent six year-old boy developed osteomyelitis after penetrating foot trauma. In 2009 the Spanish National Center of Microbiology published a series of 162 cases of *Scedosporium prolificans* infection. The most common presentations were disseminated infection (44 %), pulmonary mycosis (29 %), and bone/joint infections (10 %). All of the patients with disseminated infection had some underlying illness which likely weakened their immune response. Eighty percent of those patients were immunocompromised due to a hematologic malignancy, as was the case for our patient. Increased survival was independently associated with surgical excision. *Scedosporium prolificans* is resistant to most antifungals and a high percentage of infections are fatal. In the aforementioned case series, 47 % of infections were fatal, and that increases to 88 % among patients with disseminated infections. Antifungal use was not associated with reduced mortality. Although various antifungal combinations have been associated with anecdotal success, no consensus approach to therapy currently exists. A new azole, albiconazole, is currently in Phase III clinical trials and may provide more effective coverage of otherwise resistant strains.

A PECULIAR CASE OF MULTICENTRIC CASTLEMAN DISEASE Gaurav Goyal²; Kayla J. Kendrick³; Renuka Vivekanandan¹. ¹Creighton University Medical center, Omaha, NE; ²Creighton university medical center, Omaha, NE; ³Creighton University School of Medicine, Omaha, NE. (Tracking ID #2199160)

LEARNING OBJECTIVE #1: Recognize important associations of multicentric Castleman Disease (MCD) with human immunodeficiency virus (HIV) and human herpesvirus 8 (HHV-8) infections, along with the possibility of a neoplastic process in the monoclonal variant.

LEARNING OBJECTIVE #2: Diagnose and manage MCD appropriately

CASE: A 49-year-old female presents with progressively worsening occipital and cervical lymphadenopathy for the past 3 years. The patient also reports fevers, night sweats, chills, malaise, and a non-productive cough. Laboratory studies showed anemia with hemoglobin of 11.3 g/dL and mildly elevated sedimentation rate at 29 mm/h. Other laboratory studies showed normal LDH and C-reactive protein. CT scan of the chest, abdomen and pelvis showed multiple enlarged bilateral axillary, supraclavicular, subpectoral, submental, retroperitoneal, and para-aortic lymph nodes. A right axillary lymph node biopsy was

performed and found to be positive for atypical lymphoid infiltrate, suggestive for MCD. Immediately following these results, a screening HIV1/HIV2 test was performed and found to be positive, with the confirmatory western blot resulting significantly positive as well. At this time, her HIV viral load was found to be 104,000 with a CD4 cell count of 84 cells/cubic mm. The specimen was negative for HHV-8 staining. The molecular studies on the lymph node showed positivity for monoclonal D_H-J_H rearrangement in the IgH gene. Fluorescent in-situ Hybridization (FISH) study on the specimen showed inverted CD4:CD8 ratio and was negative for BCL6, BCL2, MYC and MALT1 loci. A bone marrow biopsy was performed which did not show any tumor involvement. Patient was initially treated with antiretroviral therapy with a combination of elvitegravir, cobicistat, emtricitabine and tenofovir that improved her fatigue and malaise. For her MCD, she was recently started on combination of rituximab and etoposide and has been clinically improving since then.

DISCUSSION: Castleman disease (CD, angiofollicular lymph node hyperplasia) is a rare lymphoproliferative disorder first discovered in 1956. Clinically, CD presents in either a unicentric or multicentric manner. At the time of diagnosis, most patients with unicentric CD are asymptomatic and are often treated with surgical resection. MCD affects more than one lymph node area and tends to be aggressive. MCD presents with systemic symptoms including fever, chills, weight loss, fatigue and night sweats. MCD is often associated with human herpesvirus 8 (HHV-8) infections and predominates in HIV-positive individuals. CD is not a malignant condition. However, MCD has been associated with an increased risk of developing certain malignancies, notably large B-cell lymphomas, follicular dendritic cell sarcomas, and paraneoplastic pemphigus. Kaposi sarcoma is also commonly diagnosed concurrently or sequentially with MCD because the two entities share a common viral pathogenesis. Imaging studies like combined positron emission tomography (PET) and computed tomography (CT) show multiple areas of lymphadenopathy. Laboratory studies show anemia, thrombocytosis, hypoalbuminemia, polyclonal hypergammaglobulinemia and elevated inflammatory markers. Diagnosis is confirmed by excisional biopsy of one of the lymph nodes that shows polyclonal nodal expansion. In the limited number of studies performed to analyze the clonality of plasma cells in CD, very few cases have been found to be monoclonal ¹⁻³. Our case is a rare monoclonal variant of MCD with IgH restriction in the presence of HIV positivity. All HIV-positive patients should be treated with highly active anti-retroviral therapy (HAART) following diagnosis. Additional treatment of MCD depends on the presence of organ failure and performance status of the patient. Patients without organ failure and HIV/HHV-8 positivity can be treated by immunotherapy alone, using siltuximab, tocilizumab or rituximab. In the presence of organ failure and poor performance status secondary to disease itself, combining immunotherapy with chemotherapy in the form of etoposide is recommended. Antiviral therapy in the form of ganciclovir is indicated for HHV-8 positivity. Prognosis in MCD is variable, ranging from an indolent course to a rapidly progressive disease culminating in death if untreated. Presence of monoclonality among lymphocytes may indicate a concurrent neoplastic process. It is therefore, imperative to have a high degree of suspicion for appropriate management of such patients. **References** 1. Soulier J, Grollet L, Oksenhendler E, et al. Molecular analysis of clonality in castleman's disease. *Blood*. 1995;86(3):1131-1138. 2. Al-Maghrabi J, Kamel-Reid S, Bailey D. Immunoglobulin and T-cell receptor gene rearrangement in castleman's disease: Molecular genetic analysis. *Histopathology*. 2006;48(3):233-238. 3. Yoshida T, Sakai A, Imagawa J, et al. Mantle cell lymphoma superimposed on multicentric castleman's disease. *J Clin Exp Hematop*. 2011;51(2):147-150.

ABIOTROPHIA DEFECTIVA MENINGITIS AFTER EPIDURAL STEROID INJECTION Jandark Yuseif¹; Omar Al-Shuwaykh¹; Sonikpreet Sonikpreet¹; marissa sardinha²; Talin Nemri²; Khalid Zakaria². ¹WSU/Crittendon hospital medical center, Rochester, MI; ²Wayne State University, Rochester, MI. (Tracking ID #2198667)

LEARNING OBJECTIVE #1: Recognize Abiotrophia Defectiva meningitis as a potential complication of epidural steroid injections.

LEARNING OBJECTIVE #2: Abiotrophia defectiva, also known as nutritionally variant streptococci, resides as oral and upper respiratory tract flora. It has been reported to cause culture-negative endocarditis and bacteremia. We report the first case of Abiotrophia defectiva meningitis.

CASE: An 82-year old female presented with 6 h of decline in mentation. She has a history of lumbar radiculopathy for which epidural steroid injections were administered. Two days prior to presentation, she received an epidural steroid injection which resulted in worsening low back pain and a new-onset severe headache. On the day of presentation, she developed progressive decline in mentation over 6 h and would only moan to painful stimuli. On examination, she was afebrile, had nuchal rigidity and a Brudzinski sign. Computed tomography of the brain revealed pneumocephalus within the lateral ventricles. Dexamethasone was administered and empirically started on vancomycin and cefepim. Fungal meningitis was also considered and voriconazole was added. Lumbar puncture had an opening pressure of 190 mmH2O. The cerebral spinal fluid (CSF) was cloudy. We

immediately examined the CSF gram stain under microscopy, which revealed gram-positive diplococci. We de-escalated antimicrobial therapy to vancomycin and ceftriaxone. CSF analysis revealed a white blood cell count of 1220/microL with 76 % neutrophils, protein of 47 mg/dL, CSF: serum glucose ratio of 0.39. The Patient's mentation returned to baseline the next day. She was discharged on 14-day course of vancomycin and ceftriaxone. Sixteen days later, identification and susceptibility on the CSF culture revealed *Abiotrophia* defective susceptible to both ceftriaxone (minimum inhibitory concentration (MIC) 1.0) and vancomycin (MIC<0.5). She was seen in our ambulatory clinic after completion of therapy with residual neurological deficit.

DISCUSSION: Epidural steroid injections are the most commonly performed intervention in the United States to manage chronic, and subacute low back and neck pain with radiculopathy. As the number of epidural steroid injections is increasing annually, physicians and patients should be aware of potential infectious complications. Fungal meningitis, Staphylococcal Meningitis, and epidural abscess have been reported as infectious complications of epidural steroid injections. The occurrence of *Abiotrophia* Defective meningitis after epidural steroid injections is extremely rare and has not been reported yet. In our case, the combination of worsening symptoms after epidural steroid injection, the forty-eight hours timeline of presentation and the presence of pneumocerebrum on CT of the brain; suggest potential meningeal penetration by the epidural injection. **Conclusion** *Abiotrophia* defective can be a cause of bacterial meningitis secondary to epidural steroid injections. Early recognition, and selection of appropriate management will help in potential cure of the disease.

ACUTE PANCREATITIS-INDUCED TAKOTSUBO CARDIOMYOPATHY IN AN AFRICAN-AMERICAN MALE John M. Franco¹; Saraschandra Vallabhajosyula¹; Saarvaani Vallabhajosyula²; Shashaank Vallabhajosyula²; Amy J. Arouni^{1,3}. ¹Creighton University School of Medicine, Omaha, NE; ²Kasturba Medical College, Manipal University, Manipal, India; ³Nebraska-Western Iowa Veterans Affairs Medical Center, Omaha, NE. (Tracking ID #2196211)

LEARNING OBJECTIVE #1: Recognize acute pancreatitis as a rare trigger for Takotsubo's cardiomyopathy and highlight appropriate management

LEARNING OBJECTIVE #2: Report the first male case and second African-American male presenting with this unique association

CASE: A 55-year old African-American male with a history of recurrent episodes of alcohol-induced acute pancreatitis and alcoholic steatohepatitis, and essential hypertension was admitted to the hospital after several hours of severe, sharp, stabbing, 10/10, non-radiating pain in the epigastrium and left lower sternal border. The pain was associated with diaphoresis, nausea, and yellow, non-bilious, non-bloody vomiting. He reported a 2-week alcohol binge prior to the intensity of the pain restricting his ability to drink alcohol the morning of admission. Abdominal examination revealed epigastric distension, involuntary guarding, and diffuse abdominal tenderness to palpation. Electrocardiogram (EKG) showed normal sinus rhythm with QT-segment prolongation and ST-T segment depression (STTSD) and T-wave inversions (TWI). Initial cardiac biomarkers i.e. troponin-I (TnI) and NT pro-beta natriuretic polypeptide were elevated at 0.29 ng/mL and 4420 pg/mL respectively. Additionally, laboratory parameters revealed elevated serum lipase and amylase at 773 IU/L and 97 IU/L respectively, and metabolic profile demonstrated elevated anion-gap metabolic acidosis with elevated serum lactate and ketones. Serial TnI was trended with peak level of 0.658 ng/mL. Transthoracic echocardiogram (TTE) showed decreased left ventricular (LV) systolic function with LV ejection fraction (EF) 30–35 %. Dilated and dyskinetic apex and hypokinetic segments in mid- and apical-anterior wall, apical lateral wall, mid- and apical-septum and apical inferolateral walls of the LV were noted. Compensatory hyperkinesia of basal segments was noted. Computerized tomographic scan of the abdomen revealed peripancreatic edema and infiltration without necrosis or fluid collections and hepatobiliary ultrasound was negative for obstructive pathology. Emergent coronary angiogram after stabilization demonstrated insignificant mild irregularities in left circumflex and right coronary arteries without obstructive coronary artery disease (CAD). Contrast left ventriculography demonstrated reduced LVEF (25 %) with apical ballooning and hyper-contractile basal segments, consistent with Takotsubo cardiomyopathy (TCM). The patient was medically stabilized on aspirin, metoprolol, and lisinopril. Due to concern for apical mural thrombus formation, the patient was started on warfarin with goal international normalized ratio of 2.0–3.0. Subsequently 3 weeks later, a repeat TTE demonstrated complete recovery of LVEF (60–65 %) with no akinetic or hypokinetic segments. His anticoagulation was stopped since no LV thrombus was noted. He continues to remain sober and is on regular follow-up with substance dependency services.

DISCUSSION: TCM, also variably known as LV apical ballooning, broken heart syndrome and stress cardiomyopathy, is characterized by LV apical ballooning and has been called that due to its resemblance of a Japanese octopus trap, a *tako tsubo*. Typically reported triggers include emotional stress, pheochromocytoma and sub-arachnoid hemorrhage. It has been hypothesized that the pathophysiology of TCM is related to coronary

micro vascular dysfunction, coronary artery spasm, catecholamine-induced myocardial stunning, reperfusion injury following acute coronary syndrome, myocardial micro infarction and abnormalities in cardiac fatty acid metabolism. The Mayo Criteria is the most widely accepted diagnostic criteria, where all four criteria must be met to make the diagnosis: (a) transient hypokinesis, akinesis, or dyskinesis of the LV mid segments with or without apical involvement, (b) absence of obstructive CAD or angiographic evidence of acute plaque rupture, (c) new electrocardiogram abnormalities (either STTS elevation or TWI) or modest elevation in cardiac troponin, (d) absence of pheochromocytoma or myocarditis. Ninety percent of patients diagnosed with TCM are postmenopausal women aged 61–76 years. This is hypothesized to be due to estrogen deficiency. Consistent with the same; the five reported cases of pancreatitis-induced TCM are females over the age of 40 years old. Alcoholic pancreatitis was first implicated as an antecedent physical stressor in a case of 'inverted' TCM in 2006. Since that time, two cases of acute gallstone, a post-endoscopic retrograde cholangiopancreatography study, and an unspecified pancreatitis-induced TCM have been described. In our case report, we described what we believe to be the first reported case of pancreatitis-induced TCM in an African-American male.

ATYPICAL CLAUDICATION IN A YOUNG ATHLETE Sumeet S. Pawar; Robert T. Eberhardt. Boston Medical Center, Boston, MA. (Tracking ID #2193947)

LEARNING OBJECTIVE #1: To review the differential diagnosis and stepwise work-up of exertional leg pain in young patients.

LEARNING OBJECTIVE #2: To recognize chronic exertional compartment syndrome and distinguish it from vascular causes of exertional leg pain.

CASE: A 26 year old male athlete presented with recurrent exertional calf tightness and foot numbness over 2 years. His symptoms only occur during vigorous sports related activities. They worsen if he does not stop and subside after rest. He does not have a history of any injuries. He had normal pulses in the lower extremities at rest. Systemic exam was unrevealing. His blood pressure in all four extremities was within normal limits. Plain radiographs and MRI of his lower extremities were unremarkable. Testing in the vascular laboratory at rest showed normal segmental pressure measurements with an ankle-brachial index (ABI) of 1.24, and normal pulse volume recording waveforms. On exercise testing, the patient developed moderate hemodynamic compromise bilaterally immediately after vigorous exercise with his ABI dropping to 0.74, but no compromise with a standard protocol. Provocative maneuvers did not cause worsening of ankle pressures. CT angiography showed normal arterial vasculature bilaterally. He then underwent exercise compartmental pressure testing that revealed exercise induced increased pressures in the antero-lateral fascial compartments of his legs bilaterally. He subsequently underwent bilateral fasciotomies. After the surgery, the patient experienced resolution of his symptoms.

DISCUSSION: Exercise induced leg pain in young patients has a broad differential of common mechanical causes such as medial tibial stress syndrome (MTSS), stress fractures, chronic exertional compartment syndrome and vascular causes such as popliteal artery entrapment and iliac artery fibroelastosis. This patient's exertional leg pain along with foot numbness resembles the symptomatology of intermittent claudication. Intermittent claudication is classically seen in peripheral arterial disease (PAD) which causes luminal narrowing and limitation of arterial flow. However, foot numbness is often a sign of advanced ischemia in patients with PAD. Various mechanical and vascular causes mentioned above can cause varying degree of exertional leg pain that mimics the pattern of intermittent claudication in the absence of occlusive PAD. Common mechanical causes such as MTSS and stress fractures are diagnosed with plain radiographs and MRI. Non-invasive testing in the vascular lab with the use of different exercise protocols and provocative maneuvers is useful to further characterize the different vascular causes of leg pain. Hemodynamic compromise from PAD, particularly involving the iliac vessels, can often be unmasked in patients with normal resting ABI after exercise testing. Popliteal artery entrapment is an anatomic (or functional) anomaly involving the gastrocnemius muscle that may cause entrapment of the popliteal artery. Exercise testing with provocative maneuvers such as passive plantar flexion and dorsiflexion causes a drop in ankle pressures and imaging reveals the anatomic impingement of the popliteal artery. Iliac artery fibroelastosis is a condition arising from endofibrotic disease and kinking of the iliac artery typically seen in long distance cyclists. Resting ABI are often <0.5 in the affected limb and imaging reveals kinking and intimal thickening of external iliac artery. Advanced vascular imaging with CT or MR angiography confirms the diagnosis of these different vascular causes. The abnormal drop in ABI after rigorous exercise in this patient with normal arterial imaging suggested that the cause may be chronic exertional compartment syndrome (CECS). CECS is an uncommon cause of atypical claudication. The diagnosis of CECS is confirmed by both resting and post exercise compartment pressure measurement. The only effective treatment for this condition is surgical compartment release.

BILATERAL FACIAL PALSY AFTER A CAMPING TRIP Sudhi Tyagi¹; Pinky Jha². ¹Medical College of Wisconsin, Wauwatosa, WI; ²medical college of wisconsin, Milwaukee, WI. (Tracking ID #2160015)

LEARNING OBJECTIVE #1: To recognize facial nerve palsy as a manifestation of Lyme disease

LEARNING OBJECTIVE #2: To learn about diagnosis and management of Lyme disease

CASE: A 19 year old male presented with bilateral facial droop, left worse than right, for 1 day before admission. His symptoms began 2 months prior while working at a summer camp in July in upper Michigan with fever to 104 along with headache and neck pain. Labs obtained then at an ED visit, including LP with CSF culture and West Nile titers, were normal. He was given 1 dose of minocycline which was discontinued since his labs were normal. His symptoms resolved within 2–3 days and did not recur until 10 days prior to admission with return of headaches and malaise. He developed conjunctival injection with bilateral eye watering and was unable to drink water without having it spill out of his mouth, could not smile, noticed slurring while he was talking and a different sensation of taste. His vital signs were within normal limits. Neck movement caused discomfort. He had left-sided weakness with eye closure, decreased left-sided nasolabial crease, was unable to close left side of mouth or puff out his cheeks. His CBC, monospot and West Nile titers were normal. HIV test was negative. His Lyme ELISA test was positive so he was initially treated with oral doxycycline. Subsequently, an LP was performed and CSF studies were consistent with meningitis. The infectious disease team was consulted. Doxycycline was discontinued in favor of IV ceftriaxone for 4 weeks. The diagnosis of Lyme meningitis was confirmed with a positive Lyme western blot test. At a clinic follow-up visit 1 month later, the patient's neurological symptoms had completely resolved.

DISCUSSION: Lyme disease is caused by infection with the spirochete *Borrelia burgdorferi*. The most commonly affected areas include the skin, joints and nervous system. In particular, about 12 % of patient's with disseminated Lyme disease develop nervous system effects. These effects range from central nervous system disease such as meningitis and nerve palsies to peripheral manifestations with radiculopathies. The diagnosis of Lyme meningitis involves a history with possibility of tick exposure, physical exam with focal neurological deficits or signs of meningitis and positive Lyme serologies in blood or CSF. The differential for facial nerve palsy includes Lyme disease, viral meningitis, atypical migraine and HIV. Establishing the correct diagnosis is crucial in determining treatment. Furthermore, distinguishing Lyme meningitis from disease that does not involve the nervous system is important in terms of therapy. Lyme meningitis frequently requires intravenous antibiotics whereas other manifestations of Lyme disease can be treated effectively with oral antibiotics

CANNABIS-INDUCED PSYCHOSIS IN A PATIENT WITH MAGICAL THINKING Laura E. Black²; Joseph Simonetti¹. ¹University of Washington, Seattle, WA; ²University of Washington School of Medicine, Seattle, WA. (Tracking ID #2199409)

LEARNING OBJECTIVE #1: Distinguish cannabis-induced psychosis from a primary psychotic disorder and manage it appropriately.

LEARNING OBJECTIVE #2: Recognize the recently identified relationship between cannabis use and schizotypal personality disorder.

CASE: A 25-year-old Hispanic man with no known psychiatric history was transported to the ED after new onset psychosis and a suicide attempt. On arrival, his family reported 2 months of increasingly reclusive behavior and heavy marijuana use. His father, with whom he lived, reported a "steady decline" in his daily functioning, abnormal sleep patterns, and depressed affect. He attempted suicide by cutting his wrists and throat. A neighbor called emergency responders, who intubated and sedated him prior to transport to a trauma center. On arrival, exam revealed a blood pressure of 138/94, heart rate of 108, 1 cm deep horizontal lacerations on both wrists, and a laceration across his throat. After emergent transfer to the operating room, he was found to have multiple wrist flexor tendon lacerations but no violation of the trachea or major neck vessels. After surgical recovery, he was transferred to the psychiatric service due to continued psychosis, including expansive affect and severely delusional thinking (e.g., he reported he was on a mission to destroy the anti-Christ). He gradually improved over a 29-day hospitalization after starting antipsychotic medications, demonstrating more organized thinking and improved reality testing. He endorsed heavy marijuana use (4 joints/day), longstanding magical thinking, odd dress, idiosyncratic religious beliefs, and preoccupation with conspiracy theories. He lacked close friendships and felt like an "outsider" due to social anxiety. He was subsequently diagnosed with schizotypal personality disorder and discharged home with follow-up.

DISCUSSION: Substance-induced psychosis is characterized by psychotic symptoms that develop in the setting of drug or alcohol use and in the absence of a primary psychotic

disorder. While cannabis intoxication causes transient psychosis-like symptoms (e.g. paranoia, hallucinations), cannabis-induced psychotic disorder (CIPD) persists beyond the period of acute intoxication, and is not attributable to a primary psychotic disorder (e.g., bipolar disorder). The prevalence of CIPD is unknown, in part due to the high prevalence of marijuana use among populations with primary psychotic disorders and difficulty in distinguishing between such disorders and CIPD. Differentiating between primary disorders and purely substance-induced psychosis is difficult acutely; it often requires stabilization of acute psychosis and follow up to monitor for underlying primary disorders. In a study comparing CIPD patients to those with primary psychotic disorders who also used cannabis, CIPD patients on average smoked more marijuana (9 vs. 5 joints/day) and more often had a family history of substance use disorder (28 vs. 10 %)[Rubio 2012]. Another study compared CIPD patients to those with acute schizophrenia and found that CIPD patients more frequently suffered expansive mood and ideation, depersonalization, and visual hallucinations (Nunez 2002), while those with schizophrenia more often present with auditory hallucinations and disorganized speech. A Finnish study of 18,000 patients admitted with substance-induced psychoses found that only 1 % were eventually attributed to cannabis use; 46 % of these eventually developed a psychotic disorder, usually within 3 years of the initial episode (Niemi-Pynttari 2013). While the association between cannabis use and schizophrenia is well known, the relationship between cannabis use and schizotypy is only recently identified. Prospective research has shown that childhood cannabis use is associated with a greater risk of developing schizotypal personality disorder (STPD)[Anglin 2012]. Data from the National Epidemiologic Survey on Alcohol and Related Conditions showed that cannabis users had a dose-dependent increase in psychotic and schizotypal symptoms. Compared to individuals with no lifetime cannabis use, users with cannabis dependence had the greatest risk of psychosis (odds ratio [OR] 3.69) and STPD (OR 7.32)[Davis 2013]. Several hypotheses have emerged regarding the relationship between cannabis use and schizotypy, including that cannabis use causes or accelerates the development of schizotypy through a direct pharmacologic effect (Davis 2013). Treatment of substance-induced psychosis requires stabilization with antipsychotic medications acutely, though medications are often discontinued within months without symptom recurrence. Psychotic symptoms may reoccur with resumption of substance use, underscoring the importance of treating underlying substance disorders. The best-known predictors of cannabis use cessation after a psychotic episode are higher premorbid social/occupational functioning and cannabis use only (vs. polysubstance)[Rebgetz 2013].

CASE REPORT: GROUP A STREPTOCOCCUS TOXIC SHOCK SYNDROME POST HEMITHYROIDECTOMY : REPORT OF A CASE AND LITERATURE REVIEW OF PRESENTING SYMPTOMS Mireille Sayegh¹; Mark Davis¹; Martin Black²; Vicky Tagalak¹. ¹McGill University, Beaconsfield, QC, Canada; ²McGill University, Montreal, QC, Canada. (Tracking ID #2195214)

LEARNING OBJECTIVE #1: Disseminated Group A Streptococcus (GAS) infection and streptococcal toxic shock syndrome following thyroidectomy has previously been described but remains a rare consequence of the surgery. We describe a case and review literature on presenting symptoms and modes of transmission.

CASE: Our patient was a 45 year-old woman admitted in October 2013 for an elective hemi-thyroidectomy for a nodule with pathology suspicious for papillary thyroid carcinoma. Her past medical history was pertinent for thalassemia minor and a remote provoked deep vein thrombosis (DVT). The day of surgery, the patient had reported mild upper respiratory tract symptoms. The surgery progressed in an uneventful fashion. No antibiotics were administered perioperatively. Twelve hours post-operatively, while hospitalized, the patient developed severe emesis, diarrhea, tachypnea and significant musculoskeletal pain. At the time, the patient was afebrile with normal laboratory investigations. During the next six hours, the patient became hypotensive and developed a lactic acidosis despite aggressive fluid resuscitation. The neck wound did not appear infected. Piperacillin tazobactam intravenously (IV), vancomycin per os (incidence of *Clostridium difficile* colitis being common in our institution) and oseltamivir IV were started. She required intubation and vasopressor support with maximal doses of norepinephrine, epinephrine and vasopressin. Continuous renal replacement therapy was initiated for anuric acute renal failure. An echocardiogram showed a globally depressed left ventricular ejection fraction of 30 % and abdominal computed tomography demonstrated pancolitis and the presence of an intrauterine device. Despite all efforts, the patient continued to require maximal support. Initial gram stain showed gram positive cocci in pairs and chains. Forty-eight hours later, blood cultures grew group A streptococcus (*Streptococcus pyogenes*). The serotype was serotype A, T12, emm12, Factor OF +. Her initial antibiotics were discontinued and she was started on Penicillin G IV, clindamycin IV, ceftriaxone IV and vancomycin IV as per protocol in our institution. Furthermore, a daily dose of intravenous immunoglobulin over 3 days was administered. Endotracheal aspirate grew GAS. A pelvic examination showed no purulent discharge, but a swab was positive for GAS. Her intrauterine device was removed. Further imaging and

drainage demonstrated the presence of a large purulent right pleural effusion which failed to grow GAS (Image 1). She was extubated on day 10 and had a favorable course thereafter.

DISCUSSION: Post-surgical GAS is defined as invasive GAS infection that occurs during the first 7 days following surgery [1]. Thyroidectomies are rarely complicated by infection, but invasive GAS has been described as a possible complication of the procedure. An extensive literature revealed 21 cases of severe GAS infections post-thyroid surgery through PubMed and Medline from 1996 to March 2014, in the form of case reports or audits. Of these 21 reported cases, at least 10 were associated with STSS. The case fatality rate of post thyroidectomy GAS is almost 50 % (10 out of 21) based on the reported cases identified. GAS infection post thyroidectomy presented within 24–48 h following surgery and, in many cases, has a fulminant course, requiring ICU admission for hemodynamic support of multi-organ dysfunction. The mode of acquisition appears variable: patient carrier, family member, surgeon or unknown (2–9). Of the cases where details about the clinical course was available (total of 20 cases), 17 reported evidence of a wound infection suggestive of a portal of entry for GAS during the operation. In only 3 cases was the wound intact with no need for exploration or debridement, similar to our case (2, 4, 7). In these three reported cases, the first presented with streptococcal pneumonia; the second with vomiting, hypotension, tachypnea and anuria and the third with fever, thoracic pain and tachycardia. In all three cases the symptoms began within 24–48 h of the thyroid surgery and in each case, the patient was admitted to the intensive care for septic shock and hemodynamic support. One of the three patients died [4]. It can be hypothesized that direct transmission/translocation of bacteria from the throat into the bronchopulmonary tree during intubation was a possible mechanism of spread in our patient's case, as well as the three other similar cases. In our case, the patient was colonized with GAS. Secondary transmission from a member of the operating team is unlikely since there was no evidence of fasciitis or surgical wound infection. As in our patient, the emm12 serotype of GAS has been reported in other STSS cases [10]. In view of our patient having a prior history of GAS pharyngitis treated with antibiotics, it is strongly suspected that endotracheal manipulation during intubation in the setting of GAS colonization resulted in bacterial translocation and invasive STSS.

CASE REPORT: SEVERE IRON DEFICIENCY ANEMIA AND POLYARTHRITIS AS A RESULT OF CHRONIC *ANCYLOSTOMA DUODENALE* INFECTION Caleb Doyle-Burr; Jessica Yee; Taiye Odedosu. New York University School of Medicine, New York, NY. (Tracking ID #219445)

LEARNING OBJECTIVE #1: Recognize hookworm, or *Ancylostoma duodenale*, infection in patients with severe iron deficiency anemia from endemic regions

CASE: Fifty-four year-old Bengali man with gastric reflux and hemorrhoids presented with 1-month onset of progressively worsening upper extremity joint pain and fatigue. The patient reported swelling, pain, stiffness and weakness bilaterally in his wrists, metacarpal, and distal and proximal interphalangeal joints. Daily naproxen had provided no relief. He denied any recent fevers, weight loss, night sweats, history of arthritis, blood disorders or autoimmune conditions. He had no sick contacts, no dietary changes and denied rashes of any kind. He had no changes in bowel habits. He denied a drinking history or excessive anti-inflammatory use. He has known asymptomatic hemorrhoids, but denied prior screening colonoscopy. Notably, the patient moved from Bangladesh two years prior to presentation. On presentation, vital signs were unremarkable, but scleral pallor and remarkable koilonychia of his finger nail beds were noted. Rectal exam was absent for masses or lesions. Fecal occult blood test was negative. Joint exam revealed tenderness to palpation on dorsal aspect of hands bilaterally with notable swelling of second and third metacarpophalangeal joints bilaterally. The patient was unable to make a fist or grasp objects. Routine laboratory revealed a hemoglobin of 7.4 g/dL, mean corpuscular volume of 54 and undetectable ferritin. He had a mildly elevated eosinophil percent count of 6 %. Rheumatoid factor, cyclic citrullinated peptide, Lyme serologies and erythrocyte sedimentation rate were negative. As part of his anemia evaluation, a colonoscopy was performed, and found numerous mobile, translucent nematodes within the cecum. Subsequent examination of stool for ova and parasite were unrevealing but images captured during colonoscopy were consistent with hookworm infestation. The patient was given oral albendazole 400 mg and discharged with oral iron supplementation and ibuprofen. Prior to discharge, the patient reported improved joint pain and range of motion. At 1-month follow-up, the patient's hemoglobin had recovered to 14.1 g/dL.

DISCUSSION: The global burden of hookworm infestation is substantial. With an estimated 438.9 million people infected in 2010, it is one of the three most common soil-transmitted infections along with *Ascaris lumbricoides* and *Trichuris trichiura*. Hookworm is thought to be responsible for the most years with lived with disability (4.98 million years) [1]. In Bangladesh, the birth place of our patient, a 2003 study revealed that more than 50 % of students aged 5 to 13 had stool samples indicative of intestinal parasites. Of those, 10.7 % were due to hookworm. [2] There are two common subtypes of hookworm known to infect humans: *Ancylostoma duodenale* and *Necator americanus*.

It is acquired via direct skin contact with soil contaminated by human waste. Hookworm larvae can penetrate dermis and migrate to blood vessels, where they eventually proceed to the lungs. The larvae penetrate alveoli and migrate superiorly into the pulmonary tree. Eventually they ascend far enough to be swallowed with saliva and enter the GI tract where they mature into adults typically 1 cm in length and can survive for up to 14 years. While uncommon in developed countries, helminthic infection, especially of hookworm, should be on the differentials in patients with iron deficiency anemia and eosinophilia from an endemic region. Iron deficiency anemia, as seen in our patient, is common to hookworm infections due to their large buccal cavities attached in the GI tract. Blood loss can be as high as 0.3 mL/day per adult hookworm, especially in *A. duodenale* infection. [3] As worm burden increases, so does the severity of anemia. Eosinophilia is a hallmark of hookworm infection, although not all patients with helminthic infection will present with eosinophilia. Numerous factors, including parasitic burden and duration of infection, can dampen immune response while an acute infection increases the likelihood of eosinophilia [4]. Although our patient's eosinophilia was unimpressive, his disease burden was high and the duration of his infection was likely prolonged given the severity of his anemia. Thus, we postulate his immune system became sensitized to the pathogen over time. Additionally, the patient presented with a bilateral, symmetric polyarthritis of unknown etiology, with partial resolution of symptoms after colonoscopy. There is one case report of a reactive arthritis with involvement of sacroiliac joint secondary to presumed hookworm infection, associated with significant eosinophilia [5] Given that a curious immunogenic relationship may exist between nematode infestation and reactive arthritis, perhaps it is not surprising to know that hookworm infection is currently investigated for its ability to suppress the immune system with potential for treating reactive diseases such as asthma. [6]

CATASTROPHIC PNEUMOCOCCAL MENINGITIS IN A PATIENT WITH AUTOSPLENECTOMY FROM LUPUS/ANTIPHOSPHOLIPID ANTIBODY SYNDROME Khushboo Sheth²; Aaron Snyder³; Ulysses Wu¹; Bimalin Lahiri¹; Prashant Grover¹. ¹Saint Francis Hospital, Hartford, CT; ²University of Connecticut, Hartford, CT; ³University of Connecticut, Farmington, CT. (Tracking ID #2191825)

LEARNING OBJECTIVE #1: To diagnose splenic infarction based on radiologic findings and the importance of vaccinations and early antibiotics in asplenic patients

LEARNING OBJECTIVE #2: To suspect and perform hypercoagulable workup in patients presenting with evidence of end organ damage (splenic infarcts and abdominal pain) due to ischemia

CASE: We present the case of a 26 year old female with past medical history significant for stercoral ulcer, complicated by bowel perforation who presented to the Emergency Department (ED) complaining of abdominal pain, vomiting, headache, subjective fever and facial pain. She was alert and oriented in the emergency department on arrival. She was given pain medications and fluids in the ED and basic labs were ordered. Four hours after her initial presentation, the patient was obtunded and minimally responsive to commands and intubated for airway protection. On repeat physical examination, her pupils were noted to be dilated and sluggish, with no corneal, cough or gag reflex. Stat computerized tomography (CT) scan of the head was negative for acute process and she was started on broad-spectrum antibiotics for suspected infection. Stat Magnetic Resonance Imaging (MRI) of the brain was suspicious for meningitis. Lumbar puncture was positive for *Streptococcus pneumoniae*, with protein 924 mg/dL, glucose <10 mg/dL, and white blood cells 3120 /UL with 86 % polynuclear cells. Old records were reviewed. The patient's spleen was small in size compared to prior abdominal CT. On an initial admission CT for bowel perforation, the spleen was 8.5 cm on coronal section with a wedge-shaped pattern appearing to be a splenic infarct. Three months later, on admission with meningitis diagnosis and repeat abdominal CT noted the spleen 5.5 cm on coronal section. She had received Pneumococcal polysaccharide vaccine (PPSV 23) on her previous admission with low *streptococcus pneumoniae* antibody response to the vaccine except for a few subsets. Pathologic report findings from her previous bowel perforation (documented as stercoral ulcer) showed ischemic mucosal injury pattern with mesenteric fat necrosis and intravascular organizing thrombi. During a prior admission, hypercoagulable workup was initiated and noted a positive antinuclear antibody (ANA) with a titer of 1:5120 and positive antiphospholipid antibodies (Lupus anticoagulant IgM 22 M units, Beta 2 Glycoprotein IgA 47 A units, Anticardiolipin IgM 39 M units). The rest of the hypercoagulable workup including protein C, protein S, antithrombin III, homocysteine, and Factor V Leiden mutation was negative. Further workup revealed positive anti double stranded (ds) DNA antibody; anti Ro/SSA antibody >8 and Anti La/SSB antibody >8. Her C3 was normal and C4 and CH50 were low. The patient underwent 2 weeks of meningitis treatment with ventilator support without any clinical or neurological improvement. Repeat CT head was consistent with cerebral edema and anoxic changes. Goals of care were addressed with family, treatment was withdrawn and unfortunately the patient passed away. Her autopsy findings were significant for a possibly infarcted spleen which weighed 35 g.

DISCUSSION: Systemic lupus erythematosus (SLE) is a chronic inflammatory disorder characterized by multiorgan involvement. Antiphospholipid (ApL) antibodies are positive in 33 % of patients with SLE. Antiphospholipid antibody syndrome (APS) is an acquired thrombophilia, caused by autoantibodies to beta 2 glycoprotein, lupus anticoagulant or anticardiolipin. Splenic involvement is seen in 9–20 % of patients with SLE. Autopsplenectomy can occur in patients with SLE due to vasculitis or due to splenic artery thrombosis. Splenic artery thrombosis is more commonly seen in patients with positive ApL antibodies. Thrombocytosis along with presence of Howell Jolly bodies, target cells, ovalocytes and spherocytes on peripheral smear, and evidence of atrophic spleen on imaging studies are imperative tip-offs of autopsplenectomy among these patients. Asplenic patients must be vaccinated against encapsulated organisms. Prompt initiation of antibiotics in asplenic patients with symptoms suggestive of infection; along with vaccination; have shown to reduce mortality. Mesenteric vasculitis and infarction are life threatening lower gastrointestinal manifestations of SLE. These patients may develop necrotic bowel segments, sepsis or perforation of their intestine. Patients with SLE can also develop thrombosis causing an acute presentation of the disease; more commonly seen among patients with coexisting APS. Autoimmune conditions, particularly SLE and APS are known causes of hypercoagulable state along with other hematologic conditions. Young patients with pathology findings suggestive of ischemia and vascular thrombosis must undergo a hypercoagulable workup, as early detection of these conditions and initiation of anticoagulants may decrease morbidity and mortality among these patients.

CHEST TIGHTNESS, AMONG OTHER THINGS... Megha Prasad. Mayo Clinic, Rochester, CA. (Tracking ID #2199408)

LEARNING OBJECTIVE #1: –Recognize the clinical findings in a patient with newly diagnosed scleroderma

LEARNING OBJECTIVE #2: –Maintain a wide differential and avoid premature closure or anchoring when managing a nonspecific chief complaint

CASE: A 49 year old gentleman presented to our tertiary referral center to outpatient internal medicine for evaluation of 8 months of shortness of breath and worsening chest tightness in the setting of a known history of asthma for the past 20 years. The patient described worsening symptoms of shortness of breath over the previous 6–7 months. HE denied any associated wheezing, weight loss, or skin rash. His symptoms did not improve with his inhalers. He had been extensively worked up for cardiovascular causes of symptoms to no avail. He had also been prescribed numerous courses of antibiotics and inhalers for presumed asthma exacerbations. After 2 months of shortness of breath, he developed diffuse abdominal pain, worse at the epigastric region. He was evaluated with laboratory testing and imaging, and was diagnosed with gastroesophageal reflux disease. An esophagogastroduodenoscopy revealed a small erosion at the gastric esophageal junction. HE was started on a proton pump inhibitor (PPI). After 2 months of PPI therapy, he continued to have nonspecific symptoms of dyspnea with exertion and at rest, as well as symptoms of gastroesophageal reflux disease. He also developed bilateral hand and forearm swelling, erythema and pain. One month later, he developed chest and neck skin tightness and erythema. He underwent consultation with dermatology in the outpatient setting, and was told that his swelling was likely secondary to PPI therapy. PPI was discontinued, but the patient continued to struggle with worsening symptoms. On presentation to the clinic, the patient described worsening shortness of breath, esophageal reflux and skin tightness over his neck and hands. His vital signs were within normal limits. Physical examination was significant for bilateral sclerodactyly. Skin appeared taut over face and neck as well. Cardiac examination was within normal limits. Pulmonary examination revealed bilateral coarse breath sounds. Bilateral lower extremities were normal in appearance. The patient underwent pulmonary function tests which were consistent with a restrictive pattern, and CT chest which showed NSIP interstitial fibrosis. The patient was positive for anti Scl 70 antibody, and was referred to rheumatology for further evaluation and management of scleroderma.

DISCUSSION: Scleroderma, also known as systemic sclerosis, is a chronic systemic autoimmune disease characterized by hardening of the skin, and can affect multiple organ systems. Our patient presents with signs and symptoms suggestive of limited scleroderma, as he mainly has cutaneous manifestation, esophageal dysfunction, and sclerodactyly. His rapidly progressive interstitial fibrosis, however, makes diffuse scleroderma the more likely etiology. Recent studies suggest that the prognosis for diffuse scleroderma is significantly worse than cutaneous scleroderma. Most often, death occurs due to pulmonary, heart and kidney complications. While there is no cure for scleroderma, relief of symptoms can be achieved with calcium channel blockers and immunosuppressants. There are several experimental therapies currently being studied, including endothelin receptor antagonists and tyrosine kinase inhibitors. Pulmonary involvement with scleroderma is an important finding. This patient struggled with shortness of breath for over 7 months, and his symptoms were attributed to asthma. PFTs did not demonstrate obstructive pattern consistent with asthma however. Interstitial fibrosis is commonly seen

in connective tissue disorders such as scleroderma, and this is important to diagnose early, to initiate appropriate treatment with hopes of preserving pulmonary function. We thus present case with a constellation of symptoms that seemed unrelated. The patient was seen by multiple specialists, but the timing of his symptoms did not allow synthesis of these into a single clinical picture. As the general internist, our evaluation of each component of the patient's complaints revealed a likely correlation between his symptoms. Our evaluation confirmed connective tissue disease as the underlying mechanism responsible for his longstanding symptoms. The patient was initiated on steroids, and will be followed for resolution of symptoms. When managing patients with multiple complaints, it is important to consider a unified diagnosis. Careful history taking and physical examination plays a key role in making the appropriate diagnosis. Moreover, premature closure and anchoring can lead to missed diagnoses, as seen in this patient who was dismissed as having asthma for several months before receiving further evaluation.

CLINICAL DISCORDANCE BETWEEN PAIN AND HYPERBILIRUBINEMIA SHOULD INITIATE EVALUATION FOR REASONS OTHER THAN A HEMOLYTIC OR VASO-OCCLUSIVE CRISIS IN PATIENTS WITH SICKLE CELL DISEASE Ahmad Masroor Karimi; Medhavi Gupta; Abdulrahman Alhathif; Ramen Sakhi; Cherian Verghese. University of Toledo, Toledo, OH. (Tracking ID #2153479)

LEARNING OBJECTIVE #1: Diagnose Gilbert Syndrome in a patient of Sickle Cell Disease with indirect hyperbilirubinemia

CASE: A 33 year old African American gentleman who has known homozygous SCD has been on regular follow up with infrequent hospitalizations. His usual clinical complaints include mild aches and pain only in his arms and legs. Interestingly he has had overt yellow discoloration of the sclera at all times, including when his pain was well controlled and other features of a pain crisis were absent. His medications included Hydroxyurea, Folic acid and Percocets. Over a period of one year, Hct has ranged from 21.5 to 25.4 %. Total bilirubin levels ranged from 12.4 to 13.5 mg/dl with the direct fraction amounting to only 0.6–0.8 mg/dl. Hgb Electrophoresis showed a Hgb S fraction of 84.3 %, A2 of 3.3 % and Hgb F at 12.4 %. He appeared compliant with Hydroxyurea as suggested by his MCV of 107.4. AST was mildly elevated but stable at 48 IU/L. ALT and ALP levels remained well within normal limits. UGT1A1 mutational analysis showed two copies of the 37(TA)8 variant. Presence of this Homozygous UGT1A1(TA)8 gene supports the diagnosis of Gilbert Syndrome.

DISCUSSION: Gilbert Syndrome is a hereditary disorder of bilirubin metabolism with a prevalence of 3–6 % in the general population. It is also known as Benign Familial Hyperbilirubinemia. Co-inheritance of Gilbert Syndrome and homozygous sickle cell disease is uncommon, but needs to be considered in the appropriate clinical setting. This condition results in impaired hepatic conjugation of bilirubin, the final metabolite of heme catabolism. In the liver, Uridine Diphosphate-Glucuronosyltransferase 1A1 (UGT1A1), helps in the conjugation of bilirubin into a water-soluble form that is excreted in bile. A dinucleotide repeat polymorphism, (TA)5–8, in the TATA box of the UGT1A1 gene leads to lower expression of this enzyme leading to chronic unconjugated hyperbilirubinemia. Co-inheritance of Gilbert Syndrome with disorders that increase the turnover of red blood cells can lead to disproportionate elevation of bilirubin levels. These include homozygous Sickle Cell disease, β -thalassemia, G6PD deficiency as well as interestingly with hydroxyurea therapy as well. Regardless of the level of hyperbilirubinemia, patients for the most part remain asymptomatic. Within the context of sickle cell hemoglobinopathies, patients can present with severe indirect hyperbilirubinemia even in the absence of acute pain or hemolytic crisis. If pain is much less than the indirect hyperbilirubinemia and common causes are ruled out, then Gilbert Syndrome should be considered. UGT1A1 mutational analysis will confirm the diagnosis.

EMPHYSEMATOUS GASTRITIS: A RARE CAUSE OF ABDOMINAL PAIN AND SYSTEMIC TOXICITY Andrew C. Rettew; Bilal Shaikh; Kyle M. Bennett; Asad Jehangir; Jonathan M. Nesfeder. Reading Health System, Reading, PA. (Tracking ID #2199203)

LEARNING OBJECTIVE #1: Differentiate gastric emphysema from emphysematous gastritis

LEARNING OBJECTIVE #2: Recognize appropriate management options for emphysematous gastritis

CASE: A 61-year-old male with a past medical history of insulin-dependent diabetes mellitus and ulcerative colitis status post total colectomy with ileo-anal anastomosis 12-years prior presented to the emergency department with severe and diffuse abdominal pain of 24 h duration. The pain was initially associated with non-bloody diarrhea, which then transitioned to multiple, violent episodes of non-bloody emesis with nausea, fevers, and chills. Upon arrival the patient was hypotensive and toxic-appearing. Initial laboratory investigation revealed an elevation in serum creatinine to 3.38 mg/dL (range: 0.50–

1.50 mg/dL) from a baseline of approximately 1.2 mg/dL, as well as a leukocytosis of 20.9×10^3 cells/ μ L (range: 4.8 – 10.8×10^3 cells/ μ L). A mild anion gap metabolic acidosis was also identified with a serum bicarbonate of 14.6 mEq/L (range: 24–31 mEq/L) and a lactate of 3.5 mEq/L (range: 0.5–2.2 mEq/L). A non-contrast computed tomographic study was obtained, which identified several distinct, yet potentially worrisome findings—air within the wall of the stomach, portal venous gas involving the left hepatic lobe, and air within the peri-gastric veins. Given the preceding clinical picture in addition to the radiographic findings, a diagnosis of emphysematous gastritis was made and emergent surgical consultation was obtained. Given the patient's previous history of a total colectomy the decision was made to attempt to manage him medically in an effort to prevent significant morbidity related to absence of both colon and stomach. The patient was admitted to the surgical intensive care unit and started on broad spectrum antibiotics, in this case piperacillin-tazobactam, provided aggressive fluid hydration, and started on a proton pump inhibitor drip. Over the ensuing week the patient's abdominal pain subsided, laboratory studies returned to baseline, and repeat computed tomographic evaluation revealed resolution of the previous findings. The patient was discharged home on hospital day 8 without complication on oral proton pump inhibitor therapy and several additional days of oral antibiotics.

DISCUSSION: Emphysematous gastritis is a rare clinical entity that is associated with significant morbidity and mortality. A result of local infection with gas-forming microorganisms by way of a mucosal defect or hematogenous spread from a distant site, this condition is quite rare given the innate defenses of the stomach, including its acidity, mucosal barriers, and plentiful blood supply. Diagnosis is based on clinical features and characteristic radiographic findings. Radiographically, air within the wall of the stomach can represent one of two clinical entities, emphysematous gastritis or gastric emphysema, the latter being an asymptomatic and benign incidental finding. Gastric emphysema is characterized by thin, linear lucencies within the stomach wall, while emphysematous gastritis is characterized by gas bubbles within the stomach wall with a "mottled" appearance as well as gas within the portal venous system. Our patient had a classic presentation including radiographic features as well as clinical and laboratory findings. Interestingly enough, our patient did not have any of the oft reported risk factors such as recent abdominal surgery/trauma, ingestion of corrosive substances, chronic alcohol abuse, or significant use of non-steroidal anti-inflammatory agents. Prompt diagnosis of this condition is quite important as early initiation of broad spectrum antibiotics and fluid resuscitation are paramount as mortality has been reported as high as 60–80 % and morbidity (e.g. gastric strictures) as high as 25 %. Surgical intervention is warranted in the setting of perforation, gastric infarction, or failed medical management. Early recognition and aggressive therapeutic intervention of emphysematous gastritis is crucial for successful patient outcomes.

EXTRA! EXTRA! SHORTAGE OF FLUCYTOSINE! Charmi Patel^{1,2}; Hiren Patel²; Dustyn E. Williams^{1,2}. ¹Tulane University, New Orleans, LA; ²Baton Rouge General Internal Medicine Residency, Baton Rouge, LA. (Tracking ID #2158483)

LEARNING OBJECTIVE #1: Contrast the limited modalities of treating Cryptococcal Meningitis in an AIDS patients

LEARNING OBJECTIVE #2: Provide risk benefit analysis for nephrotoxic medications and nephron sparing therapies

CASE: A 26 year-old African American male presents with a witnessed seizure. Upon arousal he complains of headache, neck stiffness, photophobia and phonophobia. He has a history of recently diagnosed AIDS with a known CD4 count of 34 cells/dL, for which he is not yet taking medications. His vitals are 150/60 mmHg, 64 beats per minute, 14 respirations per minute, and he has a temperature of 38.4 °C. He is no longer post-ictal and demonstrates nuchal rigidity, mild ptosis on the left eye and overt phonophobia. Jolt-acceleration test is positive. Kernig and Brudzinski signs are negative. Creatinine is 0.6 mg/dL on admission. Complete blood count reveals microcytic anemia. Computed Tomography of the brain is unremarkable. Lumbar puncture has an elevated opening pressure of 31cmH2O, gram stain showing yeasts, and a Cryptococcal antigen of >1:2560. He is started on Flucytosine and liposomal preparations of Amphoterecin. Culture of cerebrospinal fluid grows Cryptococcal Neoformans. On day six a national shortage of Flucytosine is announced, and Flucytosine is switched to high-dose Fluconazole (800 mg daily). On day eight his creatinine rises to 1.1 mg/dL, and rises again to 1.3 mg/dL on day nine. Intravenous fluid boluses of normal saline are administered prior to and after Amphoterecin administration which is delivered via slow-infusion protocol. He successfully completes a 14 day-course of Amphoterecin induction and is discharged with a creatinine of 2.0 mg/dL to complete a 21-day course of single-agent fluconazole consolidation therapy.

DISCUSSION: The standard of therapy for HIV-associated Cryptococcal meningitis is an induction phase with Amphotericin B in combination with Flucytosine for fourteen days, followed by a consolidation phase with high-dose fluconazole for 21 days. Flucytosine is

not widely available world-wide and we present a case during a time of Flucytosine shortage in the United States. Therefore, it is imperative that the general internist understand the potential alternative therapies and their comparative efficacy. In general, fungicidal therapy is superior to fungistatic therapy. The rate of fungal clearance predicts 10 week survival. CSF sterilization by 14 days predicts long term prognosis. Rapid sterilization is associated with decreased rates of relapse. Amphoterecin+Flucytosine has shown to be superior to Amphoterecin+Fluconazole in both mortality and CSF clearance of infection. Fluconazole+Flucytosine has been shown to be effective, but not moreso than Amphoterecin+Fluconazole. Fluconazole monotherapy is ineffective and should not be considered for induction therapy, whether at high-dose or low-dose Fluconazole. If we would have discontinued Amphoterecin for a rising creatinine with Flucytosine still unavailable, it would have left us with single-agent fluconazole for induction. This was an unacceptable alternative. The hospitalist should anticipate renal failure during Amphoterecin administration. Efficacy of nephron-protective strategies during the administration of amphotericin has been poorly studied, though data suggests that diuretics and mannitol are ineffective, liposomal preparations are effective, while salt loading may be beneficial in alleviating amphotericin-induced nephrotoxicity. Given the option of sub-optimal therapy with single-agent fluconazole or risk renal compromise by continuing Amphoterecin, we opted to treat with intravenous normal saline prior to and after Amphoterecin administration. A lipid formulation on a slow-infusion protocol was used as well. The patient safely completed induction despite a rise in the creatinine. These authors recommend a risk-benefit analysis on discontinuation of Amphoterecin based on clinical course, duration of therapy at the onset of nephrotoxicity, and degree of rise in the creatinine.

HICKAM'S DICTUM OF GI: DOES THE PATIENT HAVE CELIAC'S OR CROHN'S? HE CAN HAVE BOTH! Jose Ruiz. University of Miami Miller School of Medicine, Fort Lauderdale, FL. (Tracking ID #2192510)

LEARNING OBJECTIVE #1: Raise awareness of the association of Crohn's and Celiac's disease

CASE: Twenty-six year old male with chronic iron deficiency anemia presented with recurrent self-limiting episodes of abdominal pain and nausea relieved by vomiting that started a few months prior and were attributed to Irritable bowel syndrome. No other bowel movement abnormalities were present such as diarrhea, constipation or changes in consistency or composition of stool. He denied any other symptoms on review of systems. Physical examination was remarkable for diffuse abdominal pain only, with no rebound tenderness, no mucosal or skin lesions and normal rectal examination with no blood in stool as per testing. Due to the recurrence of his symptoms, imaging of the abdomen with CT was performed with unexpected findings of high grade small bowel obstruction. Further work-up with small bowel barium follow through revealed multiple areas of narrowing and irregularity in the small bowel suggesting an inflammatory disease. EGD yielded findings of duodenum with cobblestoned appearance, scalloping of the ridges and several shallow erosions. Colonoscopy was remarkable for mild inflammatory changes of the terminal ileum and erosion in the sigmoid colon. This presentation and findings were highly suggestive of Crohn's disease and treatment for it was initiated with mesalamine; however, the results of testing ordered days earlier at the beginning of the work up were surprising for a positive tissue transglutaminase IgA ab suggesting Celiac's disease which would explain this patient's chronic iron deficiency anemia. Pathology report of the duodenal biopsies was also surprising for villous blunting and increased number of intraepithelial lymphocytes which is pathognomonic for Celiac's disease. As the patient continued to have further work-up and treatment, it became more evident that his symptoms were due to a combination of both diseases: Celiac's and Crohn's. Colonoscopy was remarkable for mild inflammatory changes of the terminal ileum and erosion in the sigmoid colon. Microscopic findings of lymphoid aggregates of the entire colon were noted and focal areas of eroded epithelium. Serologic tests were positive HLA-DQ2 mutation which is consistent with his diagnosis of Celiac's disease. Other pertinent results included: negative cANCA/pANCA, borderline high sedimentation rate and elevated CRP at 1.3. Based on these findings, patient was started on a gluten free diet with significant improvement of his symptoms, increased energy and weight gain. However, sporadic relapses of symptoms and imaging showing worsening intestinal strictures prompted concomitant treatment with mesalamine, azathioprine and Humira for better control of both diseases.

DISCUSSION: This case shows an unusual finding of two disease processes as causes for a patient's symptoms. We learn that in most cases, a one diagnosis that explains the signs and symptoms is preferable and more likely than multiple diagnoses. However, for this patient, uncovering a second etiology of gastrointestinal pathology helped him to control his diseases better and to have a better quality of life. On review of literature, we found evidence that there is actually an association of Celiac's and Crohn's diseases which is

being recognized more often with the new advances in testing and increased numbers of case reports. Our learning point and suggestion to the medical community is to be aware of this association and consider testing for Celiac's disease in patients with Crohn's disease.

HIDDEN HEREDITARY HEMOCHROMATOSIS Kaylee J. Shepherd; Yonas Getachew. UT Southwestern, Dallas, TX. (Tracking ID #2195190)

LEARNING OBJECTIVE #1: Recognize that liver dysfunction can be caused by more than one disease process.

LEARNING OBJECTIVE #2: Recognize demographics, laboratory and physical exam findings that should lead to screening for Hemochromatosis.

CASE: A 62 year old Caucasian male with a history of alcohol abuse, recurrent malaria on artemether-lumefantrine, and recent travel to West Africa, presented with 104 F fever, diarrhea, hematuria, and emesis. Evaluation of the peripheral smear showed 5 % parasitemia with *Plasmodium falciparum*. Further workup revealed anemia, severe thrombocytopenia, elevated liver functions tests (AST: 1225 IU/L, ALT: 425 IU/L, total bilirubin: 7.0 mg, direct bilirubin: 4.1 mg, normal alkaline phosphatase and INR), acute kidney injury, and a new diagnosis of HIV (CD4: 438; viral load: 13,398). He rapidly improved with doxycycline and quinidine. He denied any personal history of liver disease, family history of liver/autoimmune diseases, herbal/acetaminophen use, intravenous drug use, high risk sexual behaviors, and tattoos. He had a 30 year history of consuming 3 bottles of wine per week. Physical exam was significant for morbid obesity with no stigmata of liver disease. Abdominal ultrasound (US) revealed hepatic steatosis, hepatomegaly, and increased echogenicity. Other pertinent labs were iron: 170mcg/dL, ferritin: 79,054mcg/L, and transferrin saturation: 69 %. Chronic liver disease studies were significant only for homozygous C282Y mutation. Following treatment of his malaria, his liver function tests normalized at his 4 week follow up visit, but still had evidence of iron overload: iron: 350 mcg/dL, ferritin: 2846 mcg/L, and transferrin saturation: ~ 100 %.

DISCUSSION: Malaria is known to cause elevated LFTs secondary to hemolysis, cytokines, endotoxemia, and hepatic ischemia. The pattern of liver dysfunction in malaria is typically hepatocellular with AST (2–3x ULN) > ALT (2–3x ULN) and decreased echogenicity and hepatosplenomegaly on US. In rare occasions, AST and ALT over 1000 IU/L have been reported. His degree of hepatocellular injury led us to investigate for underlying chronic liver disease. The American Association for the Study of Liver Disease (AASLD) criteria to screen for hemochromatosis are transferrin saturation > 45 %, ferritin > 200 mcg/L in men and 150 mcg/L in women, with or without common features of hyperpigmentation, hepatomegaly, or diabetes. Laboratory finding suggesting iron overload prompted us to evaluate for a HFE gene mutation. Although the diagnosis can be made based on genetic testing, liver biopsy is recommended to assess for cirrhosis in patients with elevated LFTs and ferritin levels > 1000mcg/L as this determines prognosis. Although malaria can rarely cause this degree of elevations in transaminases, in the right clinical and laboratory setting, other causes of elevated liver tests should be investigated, including testing for hemochromatosis.

HOW MANY CASES OF LADA (LATENT AUTOIMMUNE DIABETES IN ADULTS) ARE WE OVERLOOKING IN OUR OFFICE? Ana Abaroa-Salvatierra; Richard Alweis. Reading Health System, West Reading, PA. (Tracking ID #2170940)

LEARNING OBJECTIVE #1: Due to the current lack of guidelines that include diagnostic criteria and early interventions for patients with LADA, primary care providers need a high suspicion to identify and start early intervention in these patients.

CASE: A 33 year old male retired Olympic athlete with presumed type 2 diabetes mellitus on the basis of presentation one year prior with hyperglycemia, absence of ketosis, and obesity (BMI 32 kg/m²), presented to the office due to suddenly uncontrolled blood sugars. He indicated that his fasting glucoses were now above 300; confirmatory fructosamine was 476 mcMol/L. This was after a year of excellent control on metformin (latest A1C was 5.1 % 2 months prior after initial A1C was 9.1 %) and significant weight loss. Patient was compliant with diet and medications, was completely asymptomatic other than noting his high blood sugars, and had no evidence of current infectious process or other diseases identified. He had no evidence of nephropathy, neuropathy, or retinopathy. Family history was positive only for one cousin with type 1 diabetes. Before adding a second oral agent, additional lab work was performed to rule out autoimmune diabetes. The fasting C-peptide was low 0.9 ng/ml (normal 1.1–4.4) and anti-GAD was positive 0.13 nmol/l (normal < 0.02). Patient was then started on Insulin in a basal/bolus regimen and has remained under control since.

DISCUSSION: There is still a wide open discussion about the real existence of an intermediate form of diabetes between type 1 and type 2 diabetes, also known as LADA or type 1.5 diabetes. Since the first description in 1994 of this entity, multiple studies have confirmed a unique form of diabetes with special immunological, clinical, genetic and metabolic characteristics that cannot be classified according to the current Diabetes

guidelines. Studies indicate that this subgroup of patients have a faster progression from diagnosis to insulin requirement in conjunction with insulin resistance and high titers of antibodies, not only against islet cell antibodies but also against other endocrine or non-endocrine organs. With the current lack of a clear definition or guidelines, this case could have been overlooked since the patient did not meet all of the previously proposed criteria of normal BMI and age older than 35. Delay in diagnosis has long-term detriment to patients in this subcategory, as individualized treatment with the early initiation of insulin therapy and possible concomitant usage of some oral agents, e.g. thiazolidinediones, can influence the beta cell loss progression and improve metabolic control. As with all other forms of diabetes, early intervention with the appropriate therapy can decrease progression to the micro- and macro-angiopathic complications.

METHEMOGLOBINEMIA: UNLIKELY CULPRIT Raju Khanal³; Paras Karmacharya¹; Ranjan Pathak²; Anene Ukaigwe⁴; Dilli R. Poudel³; Ana Abaroa-Salvatierra²; Richard Alweis¹. ¹Reading Health System, West Reading, PA; ²Reading Hospital, West Reading, PA; ³Reading Health System, Wyomissing, PA; ⁴The Reading Health System, West Reading, PA. (Tracking ID #2157028)

LEARNING OBJECTIVE #1: To recognize acquired methemoglobinemia even in absence of classical inducing agents.

LEARNING OBJECTIVE #2: To diagnose and manage complications of methemoglobinemia treatment in previously unrecognized G6PD deficiency.

CASE: A 56-year-old-male, on R-CHOP chemotherapy and rasburicase for Stage IV mantle cell lymphoma, presented with shortness of breath and chest tightness for 1 day. He had been using EMLA cream around his port to minimize pain during infusion. Pulse oximetry showed SpO₂ of 86 %, which did not improve even with BiPAP on 100 % FIO₂. Arterial blood gas (ABG) revealed PaO₂ 215 mmHg and SaO₂ 99 %. His EKG, cardiac enzymes and computed tomography scan of the chest were unremarkable. Saturation gap between pulse oximeter and ABG prompted to think about methemoglobinemia. His initial serum methemoglobin was 8.4 %. Repeat methemoglobin was 7.6 % after IV methylene blue and hemoglobin dropped by 3 g/dL with evidence of hemolysis. Peripheral smear showed bite cells and few Heinz bodies, and the G6PD level was low (1.5 u/g Hb). Hemoglobin stabilized after 4 units of packed RBCs and methemoglobin level normalized the next day.

DISCUSSION: Two mechanisms exist in the body to reduce constantly formed methemoglobin by autooxidation to hemoglobin: NADH dependent MetHb reductase (physiologically active) and NADPH dependent MetHb reductase, physiologically inactive, which is clinically important pathway in the treatment of methemoglobinemia. The incidence of EMLA induced methemoglobinemia is unknown, but the risk is increased with large application, application on broken skin, and concomitant oxidizing agents use or drugs that compete for metabolism by CYP450 system or compete for plasma protein binding. Rasburicase induced methemoglobinemia usually occurs within 24 h of its use. However, it can develop as early as 90 min to more than 6 h. So, in our case, methemoglobinemia might have been precipitated by EMLA in the setting of prior rasburicase use, which had likely already saturated the reduction potential of NADH MetHb reductase activity. Our case also developed hemolysis after second dose of IV methylene blue. Screening of G6PD deficiency before rasburicase therapy would have cautioned against the use of methylene blue and subsequently avoided the hemolysis. It could have encouraged the physician to use an alternative therapy such as high dose vitamin C especially in a mild case of methemoglobinemia. Infact it is the drug of choice in G6PD deficiency acting independent to NADPH pathway. It is suggested that high risk ethnicity for G6PD deficiency, including African-American, Africans, Mediterranean and south Asians should be screened for G6PD deficiency before rasburicase administration. However, it may not be practical in emergency situation, such as severe tumor lysis syndrome and severe methemoglobinemia, because it takes 24 to 48 h for test results to be available. To summarize, although uncommon, EMLA can cause fatal methemoglobinemia if used concomitantly with other oxidizing agents such as rasburicase. It is recommended to test G6PD deficiency before rasburicase in people of high ethnicity prevalence, to avoid therapy related complications. However, it may be impractical in emergency situations. In cases like ours with mild symptomatic methemoglobinemia, history of recent rasburicase use, a high risk group for G6PD deficiency, treatment with ascorbic acid would be a safer first option.

NEUROLOGIC ADVERSE EVENTS IN A PATIENT RECEIVING ANTI-TNF THERAPY Dietlind L. Wahner-Roedler. Mayo Clinic, Rochester, MN. (Tracking ID #2192769)

LEARNING OBJECTIVE #1: Recognize the occurrence of neurologic adverse events in patients receiving anti-TNF therapy.

LEARNING OBJECTIVE #2: Reinforce the need of careful patient evaluation by the clinician regarding benefits versus potential harm prior to initiating anti-TNF therapy.

CASE: A 57 year old male patient presented to our institution in July 2014 for evaluation of spells consisting of intermittent blurred vision associated with light-headedness and imbalance of about 6 months duration. These episodes would occur several times a day and lasts for half an hour to one hour at a time. The blurring was described as being exacerbated by increased temperature including warm environments, a hot shower, or even drinking hot soup. The imbalance had been gradually getting worse during the last 6 months and was associated with fatigue and loss of energy. He was seen by a local ophthalmologist and underwent cataract surgery without benefit. This was followed by LASIK surgery, again without help. The patient further had a 13 year history of psoriasis treated with methotrexate which resulted in hepatic fibrosis. In November of 2013, he was started on Enbrel, which he was still receiving at the time of presentation. On physical examination there were plaques of psoriasis involving the scalp, ears, hands and elbows. On neurologic examination Lhermitte's sign was positive. Mild right lower extremity weakness was noted. The right knee reflex was lightly more brisk than the left. The plantar responses were upgoing. There was some reduction in vibration sense in his feet. His gait was somewhat broad-based, and he had difficulty with tandem gait and walking on his heels. Ophthalmologic examination revealed findings consistent with bilateral optic neuropathy. Important laboratory evaluation included a MRI of the head without evidence suggesting demyelinating plaques. However, the MRI of the cervical and thoracic spine showed an abnormal T2 signal on the left at C2 and a second lesion in the lower thoracic cord on the left. Spinal fluid exam showed a raised protein of 93 mg/dL, a low normal glucose of 54 mg/dL, raised IgG and albumin, and was positive for oligoclonal bands. Taking into account the nature of his symptoms, including Uhthoff symptom, Lhermitte symptom, and the MRI findings on the cervical and thoracic spinal cord and considering the CSF results, the diagnosis of MS was made by our neurologists. It was felt that the most likely precipitant for the development of MS in this patient had been the use of a TNF inhibitor. The Enbrel was discontinued and the patient was advised to use narrowband UVB phototherapy, Dovonex 0.005 % cream, and Synalar 0.01 % solution for his psoriasis.

DISCUSSION: Tumor necrosis factor (TNF) is a cell signaling protein involved in systemic inflammation and is one of the cytokines that make up the acute phase reaction. Inhibitors of TNF represent important treatment advances for a number of inflammatory conditions, including rheumatoid arthritis, the seronegative spondyloarthropathies, and inflammatory bowel disease. Five inhibitors of TNF are approved for the treatment of a variety of inflammatory illnesses by the FDA. These are: Etanercept, Infliximab, Adalimumab, Certolizumab pegol and Golimumab. However multiple adverse effects of TNF inhibitors have been identified. These include infections, malignancy, injection site reactions, and infusion reactions, induction of autoimmunity, heart failure and demyelinating diseases. The patient presented here gradually developed symptoms of a demyelinating disease after initiation of Enbrel (Etanercept) and was diagnosed with MS approximately 9 months after begin of TNF inhibitor therapy. The estimated rate of neurological adverse events in patients with rheumatic diseases treated with TNF antagonists has been reported to be 4 %. The mechanisms underlying the predisposition to demyelination or exacerbation of demyelination in patients treated with TNF antagonists is not well-understood. Several hypotheses have been proposed (Kaltsonoudis 2014). In patients who are candidates for anti-TNF therapy a detailed clinical and neurological examination is necessary. Close follow up and appropriate monitoring are essential and when the patients develop symptoms or signs of neurological adverse events TNF antagonists should be discontinued immediately and appropriate tests should be performed. Some rheumatology experts are also cautious about using TNF inhibitors in patients with family histories of MS.

NOT ALL COLIC IS CHOLELITHIASIS: AN UNCOMMON CAUSE OF EPISODIC RIGHT UPPER QUADRANT PAIN Gregory B. Summerville. University of California, San Francisco, San Francisco, CA. (Tracking ID #2195245)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of extra-pulmonary sarcoidosis of the abdomen.

LEARNING OBJECTIVE #2: Diagnose hepatic sarcoidosis in a patient with biopsy confirmed pulmonary sarcoidosis.

CASE: A 42 year old previously healthy woman, recently diagnosed with biopsy proven pulmonary sarcoidosis, presented with 8 weeks of intermittent epigastric and right upper quadrant (RUQ) abdominal pain. She described the abdominal pain as a constant non-radiating, dull ache that was exacerbated after meals into a sharp crampy pain lasting 30–60 min. She denied nausea, vomiting, diarrhea, melena, hematochezia, fevers, chills, jaundice, or pruritus. She endorsed decreased appetite and weight loss over the last several months. Exam revealed hepatomegaly with liver span measuring 18 cm, negative Murphy's sign, and mild tenderness to palpation and percussion in the RUQ. RUQ ultrasound

revealed marked portal and gastrohepatic lymphadenopathy with mild hepatomegaly, no definite evidence of gallstones, and a normal common bile duct (CBD) with no evidence of intra- or extra-hepatic biliary ductal dilation. Computed tomography (CT) showed an unremarkable gallbladder, diffuse periportal and mesenteric lymphadenopathy, and a hypodense nodule of the spleen. Liver function tests (LFTs) revealed a total bilirubin of 0.9 mg/dL, alkaline phosphatase of 709 u/L, gamma-glutamyl transferase (GGT) of 970 u/L, alanine aminotransferase of 83 u/L, and aspartate aminotransferase of 79 u/L. Despite a normal appearing CBD on imaging, she underwent endoscopic retrograde cholangiopancreatography (ERCP) which revealed a normal ampulla, no obstruction or biliary dilation, mild attenuation in the secondary branches, and draping over the bile ducts suggesting associated lymphadenopathy. Based upon the laboratory, imaging, and ERCP findings, the preponderance of evidence pointed to hepatosplenic sarcoidosis, and the patient was referred to hepatology for evaluation and consideration of systemic therapy for hepatic sarcoidosis.

DISCUSSION: Sarcoidosis, with a prevalence of 10–20 per 100,000, is a clinically important entity with a variety of presenting manifestations, most commonly pulmonary in nature (approximately 90 % have pulmonary disease). However, up to 30 % of patients with sarcoidosis present with extra-pulmonary disease, affecting the integumentary, cardiac, nervous, musculoskeletal, gastrointestinal, and reticuloendothelial systems. Fifty to sixty-five percent of individuals with sarcoidosis have hepatic granulomas on biopsy, and of those with hepatic sarcoid, 25–35 % have LFT abnormalities and only 5–15 % are symptomatic. Symptoms of hepatic sarcoidosis include hepatomegaly, pruritus, pain, fever, nausea, weight loss, and jaundice. African-Americans are twice as likely to have hepatic sarcoidosis as Caucasians. Patterns of LFT abnormalities seen include cholestatic (43 %), hepatocellular (23 %), and combined (34 %). The degree of LFT abnormality is associated with the extent of fibrosis and granuloma burden. Sarcoidosis can involve both the intra- and extra-hepatic biliary tree. Intrahepatic involvement is granulomatous, and usually produces both hepatocellular and cholestatic LFT abnormalities. Extra-hepatic involvement results in stricture, and produces predominantly cholestatic LFT abnormalities. Criteria for diagnosing hepatic sarcoidosis in biopsy-confirmed sarcoidosis without hepatic biopsy, per "A Case Control Etiologic Study of Sarcoidosis" (ACCESS), are: 1) LFTs greater than three times normal, or 2) CT scan compatible plus elevated alkaline phosphatase. On CT, the liver appears homogeneous, with 10–15 % of patients showing hypoattenuating nodules. The gold standard for diagnosis involves percutaneous liver biopsy, which will demonstrate non-caseating granulomas. However, biopsy is usually not initially performed unless there are severe LFT or synthetic function abnormalities. Diagnosis of isolated hepatic sarcoidosis should be one of exclusion given that numerous other clinical entities can cause hepatic granuloma formation, including but not limited to tuberculosis, fungal and parasitic infections, malignancies, drug reactions, and primary liver diseases. Hepatic sarcoidosis is an important entity to diagnose given that it can mimic many other common conditions, some of which include cholelithiasis, biliary dyskinesia, dyspepsia, gastritis, gastroesophageal reflux disease, irritable bowel syndrome, and gastroparesis. Recognition of the clinical signs and symptoms, along with the laboratory and radiographic findings of hepatic sarcoidosis by internists, allows for an expeditious diagnosis without subjecting the patient to unnecessary testing.

QUETIAPINE-INDUCED HYPERTRIGLYCERIDEMIA CAUSING ACUTE PANCREATITIS John M. Franco¹; Saraschandra Vallabhajosyula¹; Timothy J. Griffin^{1,2}. ¹Creighton University School of Medicine, Omaha, NE; ²Nebraska-Western Iowa Veterans Affairs Medical Center, Omaha, NE. (Tracking ID #2196388)

LEARNING OBJECTIVE #1: Recognize rare triggers of acute pancreatitis such as hypertriglyceridemia caused by a rare complication of antipsychotic medications

LEARNING OBJECTIVE #2: Highlight the frequently ignored metabolic complications of quetiapine use for the education of the general internist

CASE: A 50 year-old Caucasian veteran presented with progressive 10/10 epigastric pain radiating to the back, associated with nausea since six days. Additionally, he endorsed fatigue, polyuria, and polydipsia for the past one month. He had a history of bipolar disorder, hyperlipidemia, type-2 diabetes mellitus, morbid obesity, irritable bowel syndrome, generalized anxiety disorder and a history of alcohol abuse. The previous day his primary physician, for these complaints, saw him where routine laboratory parameters revealed triglycerides 3590 mg/dL, lipase 2079 IU/L and elevated blood glucose of 533 mg/dL with a hemoglobin A_{1c} of 10.4 gm%. Admission laboratory parameters revealed pancytopenia with 3.9 leucocytes/mm³, hemoglobin of 12.4 gm/dL and platelets of 129/mm³. Differential leukocyte count revealed 40.8 % neutrophils and 44 % lymphocytes. Metabolic panel demonstrated normal electrolytes, hepatic and renal function. Abdominal ultrasound was unrevealing for gall bladder or bile duct pathology. He was managed conservatively for acute pancreatitis with bowel rest, intravenous hydration and adequate pain controlled. He was started on intravenous insulin for suspected hyperglycemic hyperosmolar syndrome and triglyceridemia. Additionally, he was started on oral gemfibrozil and within 24 h of initiating treatment, the patient's triglycerides decreased to

1334 mg/dL and blood glucose levels were better controlled. The triglyceride levels continued to improve to 684 mg/dL at 72 h. He started to tolerate an oral diet and was transitioned to his home medications of atorvastatin with the addition of fenofibrate. The combination of hypertriglyceridemia, hyperglycemia, and pancytopenia with predominant neutrophil depression made us suspect quetiapine as the cause for these abnormalities. The patient was tapered off of quetiapine over the subsequent two days and ziprasidone was initiated. He was subsequently discharged on hospital day seven with triglyceride levels of 628 mg/dL and serum glucose <200 mg/dL for over 24 h. His leukocyte count was 6,0/mm³ with additional normalization of other cell lines. At 2-month post-hospitalization follow-up, the patient continued to improve with good medication compliance and remained symptom-free.

DISCUSSION: Quetiapine is a second-generation antipsychotic (SGAs) that is frequently-prescribed for patients with major depressive and bipolar-type disorders, shown to significantly reduce the number of psychiatric admissions ($P < 0.001$) and episodes of emergent suicidality compared to placebo (0.3 and 0.5 %, respectively). Metabolic disturbances including hyperglycemia, hypertriglyceridemia are well-documented side effects of SGAs, seen in up to 10 % of patients treated with olanzapine or quetiapine. The mechanism by which quetiapine causes hyperlipidemic disturbances is not entirely understood. Some hypothesize that the medication stimulates hepatic triglyceride production and secretion or alters lipase-mediated triglyceride hydrolysis. Medications are attributed as the cause for only 0.1–7 % of acute pancreatitis cases. Acute pancreatitis caused by hypertriglyceridemia side effects of quetiapine use has only been reported in as few as five published case reports. Hypertriglyceridemia (>600 mg/dL) is frequently reported with quetiapine use in asymptomatic patients, but severe hypertriglyceridemia (>1000 mg/dL) has been reported in fewer than 10 patients treated with quetiapine. SGAs also possess a well-documented side effect of blood dyscrasias, such as agranulocytosis. While this side effect is documented most frequently with clozapine use, seen in up to 3 % of patients taking this medication, quetiapine has also been shown to depress leukocyte cell lines with unknown incidence. Leukopenia associated with quetiapine is most predominantly pronounced by selective absolute neutrophil depression. We reported a case of hypertriglyceridemic pancreatitis likely as a result of caused by quetiapine use. This case also emphasizes the importance of routine laboratory follow-up when initiating therapy with SGAs. We believe that this case study will aid clinicians identify, with confidence, a rarely published serious side effect of a common antipsychotic medication.

RISK OF COLORECTAL CANCER SCREENING IN A PATIENT WITH ADVANCED KIDNEY DISEASE Kaylee J. Shepherd; Anil N. Makam. UT Southwestern, Dallas, TX. (Tracking ID #2192947)

LEARNING OBJECTIVE #1: Polyethylene glycol based preparations can cause volume overload in patients with heart failure and/or renal insufficiency so caution is needed.

LEARNING OBJECTIVE #2: The decision for colorectal cancer screening should be individualized based on life expectancy given the inherent lag time to benefit.

CASE: A 65 year-old male with advanced chronic allograft nephropathy following kidney transplant in 2004 with plans for hemodialysis initiation presented to the hospital's endoscopy lab with shortness of breath and hypoxia. His medical history was significant for heart failure with preserved ejection fraction and 4 tubular adenomas (one 1.5 cm in size) removed in 2011 during a screening colonoscopy. Family history was remarkable for a brother with colorectal cancer (CRC) in his 40s. His initial surveillance colonoscopy 5 months prior was inconclusive because of inadequate preparation, therefore a repeat colonoscopy was ordered with instructions to drink two full doses of polyethylene glycol (PEG)-based preparation during the two days preceding the procedure. When he presented to the endoscopy lab, he was hypoxic with an oxygen saturation of 86 % on room air with symptoms of leg edema and shortness of breath, at which time he was admitted to the Internal Medicine service. Upon examination, his pulse oximetry was 96 % on 3 l of oxygen; he was in mild respiratory distress, had bilateral rales in the lower lung fields, and pitting edema in his lower extremities. Chest X-ray showed moderate bilateral pulmonary edema. He improved following diuresis with furosemide and was discharged two days later.

DISCUSSION: PEG-based preparations are considered to be the safest options, but are still recommended to be used with caution in patients with impaired renal function and heart failure. The dose of PEG that our patient received contained approximately 70.68 g of sodium, the equivalent of 19 l of normal saline. This massive fluid and salt intake was ultimately responsible for his volume overload necessitating hospitalization. Given that this patient was at higher risk for developing CRC due to his family history and personal history of tubular adenomas, surveillance colonoscopy is recommended every 3 years. However, the decision for CRC screening should be individualized based on life expectancy. The rationale for forgoing further CRC screening in patients with short life expectancy is that these patients are unlikely to benefit from screening due to the inherent

time lag, but remain exposed to the risks of the procedure. On average, it takes 10.3 years to prevent 1 death from CRC for every 1000 patients screened. Furthermore, surveillance colonoscopy yields a low incidence of CRC and has a relatively high rate of peri-procedural complications among older adults. For our patient nearing end-stage renal disease, his limited life expectancy and high comorbid burden highlight the importance of shared decision making. During this hospitalization, he decided to forgo further CRC screening, since the risks of CRC screening likely outweigh the benefits. However, in such patients with advanced kidney disease and heart failure who opt to undergo a screening colonoscopy, we recommend a more cautious bowel preparation.

SEROTONIN SYNDROME IN THE SEPTIC PATIENT Maria Nardell. Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2181288)

LEARNING OBJECTIVE #1: Recognize serotonin syndrome in the setting of severe sepsis

LEARNING OBJECTIVE #2: Recognize methylene blue as a precipitating cause of serotonin syndrome

CASE: A 25-year-old male on 80 mg fluoxetine daily presented with peritoneal signs and in severe sepsis with lactic acid of 10. CT showed a perforated appendix. Intraoperatively he received sevoflurane. The surgeon injected two doses of methylene blue intravenously due to difficulty visualizing the ureters. In the recovery room, the patient had a temperature of 103.1 F, heart rate 180 beats per minute, and blood pressure 166/106 mm Hg. He was diaphoretic, agitated and confused. This was initially interpreted as postoperative delirium, and he was given 1 mg haloperidol. Upon careful exam, he had horizontal ocular clonus and rigidity but normal reflexes. Creatinine kinase was 5875 but leukocytosis and lactic acidosis were resolved. Serotonin syndrome, malignant hyperthermia, and neuroleptic malignant syndrome were high on the differential. The patient was intubated and started on midazolam for serotonin syndrome. He was briefly on dantrolene to treat malignant hyperthermia but it was discontinued after it was established that carbon dioxide levels had remained within normal range intraoperatively and on blood gas post-intubation. After initial improvement, several hours later his temperature was 104.5 F despite upward titration of midazolam, a cooling blanket, and acetaminophen. Cyprohepadine, a serotonin antagonist, was given with improvement in temperature and continued with maintenance doses for two days. A low-grade fever with episodes of hypotension and a distended abdomen were concerning for ongoing infection. Repeat CT scan revealed a pocket of fluid in the abdomen and percutaneous drain was placed. Peritoneal fluids grew *Pseudomonas aeruginosa* and antibiotics were broadened. He was extubated on day 8 and discharged on day 12.

DISCUSSION: This case highlights a fulminant presentation of an often unrecognized yet potentially life-threatening condition. Serotonin syndrome is an adverse drug reaction resulting from excess serotonergic agonism of central and peripheral receptors. A clinical diagnosis classically described as a triad of mental status changes, autonomic hyperactivity, and neuromuscular abnormalities, it can be challenging to diagnose given non-specific symptoms and range of clinical severity. This case was additionally challenging due to severe sepsis on presentation and exposure to a volatile anesthetic. The normal white count and resolved lactic acidosis argued against a worsening septic picture. Ocular clonus and rhabdomyolysis were also not explained by sepsis. Decrease in temperature with a benzodiazepine and serotonin antagonist and not with an antipyretic suggested hyperthermia due to serotonin syndrome and not fever alone.[i] Hyperthermia in serotonin syndrome involves serotonin's role in thermoregulation, excess skeletal muscle activity, and vasoconstriction impairing heat dissipation.[ii] Additional features of serotonin syndrome, lower extremity clonus and hyperreflexia, were not significant in this case, but hypothermia induced by anesthesia can suppress these signs.[iii] Neuroleptic malignant syndrome (NMS) and malignant hyperthermia (MH) were also on the differential. In both, rigidity is typically more striking. In contrast to this acute presentation, NMS usually begins one to three days after the administration of a dopamine antagonist. History from family indicated that he did not use antipsychotics, and he received 1 mg haloperidol only after his neurologic symptoms had presented. MH was less likely with no rise in carbon dioxide levels. Alcohol withdrawal or other illicit drug interactions were considered though drug screens were negative, and retrospectively the patient confirmed no ingestions. Thyroid storm was on the differential but TSH was normal. The clincher for serotonin syndrome was discovering the precipitant—two doses of methylene blue used intraoperatively to visualize the ureters. The patient had taken fluoxetine (half-life ~7 days) the day of presentation. There are multiple case reports of serotonin syndrome resulting from the co-administration of methylene blue (half life ~6 h) and a selective serotonin reuptake inhibitor.[iv] Methylene blue is a potent reversible inhibitor of monoamine oxidase (MAO) subtype A. Such inhibitors are strongly associated with severe cases of the syndrome, especially in combination with SSRIs.[v] [i] Florian E, Zilker T. Bench-to-bedside review: Mechanisms and management of hyperthermia due to toxicity. *Crit Care*. 2007;11:236. [ii] Rusyniak DE. Hyperthermic syndromes induced by toxins. *Clin Lab Med*. 2006;26:165–84. [iii] Stanford SC et al. Risk of

severe serotonin toxicity following co-administration of methylene blue and serotonin reuptake inhibitors. *Jr Psychopharm.* 24;2010:1433–8. [iv] Stanford, Risk serotonin, *Jr Psych.* 2010. [v] Boyer E, Shannon M. The Serotonin Syndrome. *N Engl J Med* 2005; 352:1112–1120.

SEVERE HEMOLYTIC ANEMIA : AN EXTREME EXTRAPULMONARY MANIFESTATION OF MYCOPLASMA PNEUMONIAE, IT'S MANAGEMENT AND SUCCESSFUL RECOVERY. kaushik Mandal; Ashir Shah; Craig Thurm; Ritesh Kumar Patel; Apurwa Karki; Sudheer Chauhan. Jamaica Hospital Medical Center, Jamaica, NY. (Tracking ID #2190364)

LEARNING OBJECTIVE #1: About 3 to 10 % of patients with *mycoplasma pneumoniae* develop clinical pneumonia and upto 10 % of the patients develop extrapulmonary complications, involving the central nervous system, cardiovascular, gastrointestinal, and hematological systems. Cold agglutinins specific for I antigen of RBCs are present in 50–60 % of the patients and responsible for subclinical to mild hemolysis; but severe hemolysis is rare. We report a case of severe autoimmune hemolytic anemia secondary to *Mycoplasma pneumoniae*, its early recognition and prompt management of the extreme crisis.

CASE: A 53-year-old female with no known past medical history was admitted to ICU with severe anemia. She was seen by her physician for nonproductive cough 15 days ago and was prescribed amoxicillin-clavulanate for seven days. Patient's symptoms remained the same without worsening until last five days before presentation with rusty productive sputum, associated shortness of breath, fatigue and paleness. No family history of hematological disorder. On physical examination, the patient was very pale and tachycardic (123 beats/min). Blood pressure was 93/56 mmHg and body temperature was 36.3 °C. Chest examination showed rales and rhonchi in the left upper lobe posteriorly otherwise clear without wheeze. Respiratory rate was 26/min. no murmurs. The rest of the examination was unremarkable. Initial blood count showed hemoglobin of 3.9 g/dL, mean corpuscular volume of 97.7 fL, and WBC count of 70,400/mm³, with 54 % neutrophils, 6 % lymphocytes, 1 % monocytes, and a platelet count of 710,000/mm³, reticulocytosis of 12 %. Lactate dehydrogenase (LDH) was 7510 U/L (reference range: 313–618 U/L). Total bilirubin was 2.7 mg/dL (normal 0.2–1.3 mg/dL), of which 2.5 mg/dL was indirect. Haptoglobin was 8 mg/dL (normal 43–212 mg/dL). Liver enzymes ALT: 138, AST: 235, Alkaline phosphatase: 135. Serum chemistry revealed Na⁺: 131, K⁺: 6, HCO₃⁻: 17, BUN/creatinine 21/1.1. Coagulation studies significant for INR: 1.5, D-DIMER: 15092. Lactic acid level was 9.60 (normal 0.00–2.10 mmol/L). A peripheral blood film showed marked leukocytosis and agglutination. Blood, sputum and urine cultures were negative. The chest X-ray showed left upper lobe infiltration. Patient was started treatment with aggressive hydration and broad spectrum antibiotic. Direct Coombs test was positive. *Mycoplasma pneumoniae* IgM and IgG antibody titers were positive too. Cold agglutinins were positive with high titer of 1:5120. CT scan thorax revealed left upper lobe pneumonia with prevascular lymph nodes measuring up to 1.6 × 1.2 and 1.0 × 0.5 cm noted, small right interlobar arteries. The patient was diagnosed with severe hemolytic anemia complicating *M. pneumoniae* infection. She was continued treatment with IV azithromycin 500 mg/day for 2 days, followed with oral therapy, once daily to complete 10 days, 1 mg folic acid daily and packed red cell transfusion (6 units) using in-line blood warmer. She received plasmapheresis once on day 2 to remove IgM antibodies contributing to severe hemolysis. Anticoagulation was not started because of severe hemolytic anemia and also the tiny pulmonary embolus was very unlikely the cause of patient's presentation. The symptoms were rapidly improved and hemoglobin increased to 12.0 gm/dL. The antibiotic was continued for a total of 10 days. The patient was discharged in good health after 7-day hospital stay. On discharge, Hb, blood chemistry and coagulations studies were normal, Cold agglutinins were undetectable. Patient was started on Rivaroxaban for pulmonary embolus. One month after the discharge follow up, she remained clinically well, her physical examination was normal; her hemoglobin was 13.8 gm/dL.

DISCUSSION: Cold agglutinins for I antigens of red blood surface attributes to hemolysis. Ninety percent of these cold agglutinins are mediated by IgM molecules which usually causes hemolysis about six days after pulmonary manifestation. Treatment in setting of severe hemolytic anemia is challenging. In such setting packed red blood cell transfusions can aggravate hemolysis, but evidence has shown the risk of transfusion-related hemolysis could be reduced by using an in-line blood warmer at 37°C and keeping the patient warm as in our case [1]. Use of Corticosteroids, plasmapheresis and cytotoxic drugs has been reported in severe refractory cases [2]. In our case we did early plasmapheresis clearing the agglutinins, which improved patient's condition with supportive treatment and antibiotic dramatically. The purpose of our case report is to emphasize on early recognition and management of such crisis aggressively with all modalities available. **References:** 1. Gertz M.A. Cold hemolytic syndrome. *Hematology Am Soc Hematol Educ Program* 2006:19–23 2. Geurs F, Ritter K, Mast A, Van Maele V. Successful plasmapheresis in corticosteroid-resistant hemolysis in infectious

mononucleosis: role of autoantibodies against triosephosphate isomerase. *Acta Haematol.* 1992; 88:142–14

SIPE: A PRICE FOR A PRIZE Mekhala Chandra; Thomas J Nuckton. California Pacific Medical Center, San Francisco, CA. (Tracking ID #2182940)

LEARNING OBJECTIVE #1: To recognize the clinical features and imaging findings of swimming-induced pulmonary edema (SIPE).

LEARNING OBJECTIVE #2: To recognize that SIPE is typically self-limited, but can recur.

CASE: A 37 year-old woman developed sudden-onset dyspnea after completing a long distance swim from Northern Ireland to Scotland (North Channel; total distance 35 km/21 mi). She had previously completed multiple open-water swims, including solo crossings of the English Channel, the Cook Strait, and others. On the day of her North Channel swim, the water temperature was 12.8 °C (55 °F). During the swim she was stung multiple times by jelly fish (*Cyanea capillata*). She successfully completed the swim in 13 h and 6 min. Rough seas required her to swim at maximal effort during the final hour. Shortly after completing the swim, she developed acute-onset dyspnea without chest pain. She was admitted to a local hospital with a respiratory rate of 28, room-air SPO₂ of 83 %, and crackles on exam; BP and HR were normal. CXR revealed diffuse bilateral opacities. She was given supplemental oxygen and antibiotics, but no diuretics. She improved and was discharged the following day. After flying back to her home in the U.S., dyspnea with pleuritic pain persisted. 6 days after the swim she was again admitted to a hospital with mild tachypnea and room-air SPO₂ of 87 %. BP and HR were normal. Chest CT was negative for emboli and showed modest bilateral pleural effusions (R>L) with minimal airspace consolidation. She was started on antibiotics, given a single dose of Furosemide 20 mg IV, and admitted with supplemental oxygen to a telemetry ward. 2-D Echo was normal. She improved gradually and was discharged to home on hospital day 3.

DISCUSSION: SIPE was first described in 1981 by Wilmshurst, et al., and has been reported in previously healthy swimmers, divers, and military personnel. SIPE is characterized by sudden-onset cough, dyspnea, confusion, and hypoxia. While the exact pathophysiology remains uncertain, it has been associated with exertion and colder water. Hydrostatic pressure from water on the extremities, combined with cold-induced vasoconstriction, may increase central blood volume. Pulmonary hypertension related to exertion may cause an increased pressure gradient across the pulmonary capillaries. Overhydration and maximal exertion may have contributed to SIPE in our patient. Jelly fish stings and aspiration of seawater may have also contributed. Treatment of SIPE consists of supportive measures. Diuretics are of questionable benefit but have been used in some case series. Recurrence of SIPE is difficult to predict. Careful questioning revealed that our patient had dyspnea after a long-distance swim in cold water 2 years earlier. Slower-paced swimming in warmer water may be of benefit.

SPORADIC SUPERIOR MESENTERIC ARTERY DISSECTION WITH BACK PAIN Tamaki Kakuwa²; Christine Kwan¹. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Sapporo, Japan. (Tracking ID #2199948)

LEARNING OBJECTIVE #1: Recognize that superior mesenteric artery (SMA) dissection can present with back pain

LEARNING OBJECTIVE #2: Treat SMA dissections according to the guidelines for Stanford type B dissections

CASE: A 59 years old Asian man presents with 5 h worsening lower back pain that starts while eating lunch. He describes his pain as located in the mid-lumbar area, stabbing, constant, 10/10, non-radiating, and not improved or worsened by anything. Other review of systems is within normal limits (WNL). The patient's past medical history includes untreated hypertension. He smokes 2 packs/day for 40 years and drinks 2–3 times/month but denies any recreational drug use. His father also has hypertension. On physical exam, vital signs include temperature 36.3, pulse 70, blood pressure 208/124, respiratory rate 20, and O₂ saturation 99 % room air with body mass index 33 kg/m². Generally, the patient is diaphoretic and restless. His conjunctiva is pale on head exam. His abdomen is soft, tender peri-umbilically, and flat with positive bowel sounds but no rebound, guarding, rigidity, bruit, Murphy's/Cullen's sign, McBurney's point tenderness, pulsatile mass, or costovertebral angle tenderness. Dorsalis pedal pulse is 1+ on the right and 2+ on the left. The rest of the exam, including the back, is WNL. Labs, including complete blood counts and chemistries, are WNL except white blood cell 12,900 /mCL, fibrinogen 444 mg/dL, and triglyceride 226 mg/dL. Given suspicions of abdominal aortic dissection, abdominal computed tomography (CT) shows a mural thrombus around an abdominal aortic aneurysm (maximum diameter: 45 mm), proximal SMA dissection, thrombus in proximal inferior mesenteric artery (IMA), and collateral vessels from the distant SMA to distant IMA. He is thus kept on bed rest while nil per os with antihypertensive treatment on intravenous (IV) nitroglycerin and landiolol with oral olmesartan, amlodipine, and

bisoprolol. Repeat CT the next week incidentally shows a new pulmonary embolism although he reports no new symptoms or signs; lower extremity Doppler ultrasound also shows a left deep venous thrombus. He is thus started on heparin and warfarin bridge. Because the CT does not showing enlargement of the SMA dissection, he is discharged with follow-up CT in 1 month.

DISCUSSION: SMA dissection usually presents with acute abdominal pain although nausea, diarrhea, melena, and back pain, such as the above patient, may rarely occur; in fact, a literature search shows only 9 other reports about SMA dissection's presenting with back pain. A bruit may occasionally be heard along with weak bowel sounds. Because of the few number of SMA dissection cases, no guidelines exist yet on its treatment; instead, the guidelines for the treatment of Stanford type B dissections are used. The mainstay of therapy, conservative medical management of blood pressure, includes the use of IV beta-blockers; lifelong oral beta-blocker therapy is thereafter recommended to maintain blood pressure <120/80. After obtaining a baseline chest/abdomen CT or magnetic resonance imaging, follow-up imaging should be performed at 3, 6, and 12 months with subsequent studies every 1–2 years if no progression is found.

SYNCOPE WITH AN ABNORMAL EKG: NOT ALWAYS BRUGADA Jien Shim; Athanasia Vasiladis. Mount Sinai Hospital, New York, New York, NY. (Tracking ID #2194828)

LEARNING OBJECTIVE #1: Identify apical hypertrophic cardiomyopathy as a cause of syncope in young adults & Recognize clinical features of apical hypertrophic cardiomyopathy.

LEARNING OBJECTIVE #2: Distinguish EKG abnormalities in apical hypertrophic cardiomyopathy from other hypertrophic cardiomyopathies.

CASE: A 27 year old Chinese male with no significant past medical history presented to the outpatient clinic with a history of syncope 3 months prior to the visit. It occurred while he was playing basketball. He denied any associated chest pain, shortness of breath, dyspnea on exertion, lower extremity edema, nausea, vomiting, dizziness, or lightheadedness. He reported going to the hospital at that time after regaining consciousness after a few seconds. He had a work up, including an electrocardiogram, echocardiogram, and holter monitoring. He was told that he had an abnormal EKG, but otherwise a normal work up. The patient had two previous similar episodes; one at age 16 and the other at age 24. He did not get full medical work up at those times. The patient denied taking any medications, including over the counter medications or herbal products. The patient denied any family history of heart disease, sudden death and the rest of his family history was unremarkable. He was a nonsmoker and denied any alcohol and illicit drug use. On exam, vital signs were within normal limits: blood pressure: 123/75 and heart rate: 75. The patient was well appearing and in no acute distress. His JVP was normal. His heart exam had normal s1 and s2 with regular rate and rhythm, and no audible murmurs, rubs, or gallops. Lungs were clear to auscultation bilaterally. His extremities were warm and well-perfused without pitting edema. The laboratory results were within normal limits with a normal complete blood count, platelets, and differential, liver function tests, and basic metabolic panel. His electrocardiogram showed normal sinus rhythm at 84 bpm with normal axis, but with voltage criteria for left ventricular hypertrophy and significant ST segment elevations anteriorly in leads V1-V2, ST depressions in inferior leads II, III, and aVF with deep T wave inversions diffusely in leads I-III, aVF, V3-V6, suggestive of acute ischemia. At this point, patient was sent to the emergency room for further management of these findings and was ruled out for acute coronary syndrome. The transthoracic echocardiogram showed apical hypertrophic cardiomyopathy without outflow obstruction with otherwise normal left and right ventricular size and function. With the history of several syncopal episodes and evidence of apical hypertrophic cardiomyopathy on the TTE, the patient was referred for an electrophysiology study due to concern for exertional ventricular tachycardia in the setting of cardiomyopathy and possible AICD placement.

DISCUSSION: Apical hypertrophic cardiomyopathy is a morphologic variant of hypertrophic cardiomyopathy, involving predominantly the apex of the left ventricle. It is more common in Asia, up to 41 % of hypertrophic cardiomyopathy patients in China and 25 % of hypertrophic cardiomyopathy patients in Japan.¹ In non-Asian population, the prevalence is 3 % of hypertrophic cardiomyopathy patients. Patients may present with syncope, chest pain, palpitations or dyspnea. However, often times they may be asymptomatic. 12-lead electrocardiogram typically shows giant T wave inversions with ST segment depressions. Giant T wave inversions are thought to be due to apical hypertrophy leading to local ischemia.² This is different from other types of hypertrophic cardiomyopathy which may have normal ECG, prominent Q waves in inferior leads, P wave abnormalities suggesting atrial enlargement, or left axis deviation. All patients with suspected hypertrophic cardiomyopathy should get an echocardiogram for accurate diagnosis. Cardiac magnetic resonance imaging can assist in characterizing extent and distribution of hypertrophy and fibrosis. Unlike typical hypertrophic cardiomyopathy, this apical variant does not have left ventricular outflow tract obstruction, and have been shown to have a relatively benign prognosis.³ Long-term complications include apical aneurysms, apical myocardial

infarctions, and arrhythmia.⁴ ¹ Ho AM, Chui PT, Lee AP, Wan S. Hypertrophic cardiomyopathy apical variant. *Cleve Clin J Med.* 2014 Sep;81(9):517–9. ² Freitas A, Canovas E, Rubio J. Electrocardiographic Changes Announcing the Rapid Development of Apical Hypertrophic Cardiomyopathy in an Adult Male. *Ann Noninvasive Electrocardiol.* 2014 Sep 18. ³ Eriksson MJ, Sonnenberg B, Woo A, et al. Long-term outcome in patients with apical hypertrophic cardiomyopathy. *J Am Coll Cardiol* 2002;39:638–45 [PubMed] ⁴ Sustained cavity obliteration and apical aneurysm formation in apical hypertrophic cardiomyopathy. Matsubara K, Nakamura T, Kuribayashi T, Azuma A, Nakagawa M *J Am Coll Cardiol.* 2003 Jul 16; 42(2):288–95.

THE HEART OF ATTENTION DEFICIT Patrick A. Proctor²; Thomas Montgomery¹; Theodore A. Frank¹; Markus Scherer¹. ¹Carolinas Healthcare System, Charlotte, NC; ²Carolinas Medical Center, Charlotte, NC. (Tracking ID #2180067)

LEARNING OBJECTIVE #1: Stimulant medications used in the treatment of ADHD can cause serious and potentially life-threatening side effects, including pulmonary hypertension.

LEARNING OBJECTIVE #2: Side effects of stimulant medications appear to be dose dependent, and care should be taken to use the lowest effective doses for treatment of ADHD.

CASE: A 19-year-old Caucasian man presented to the hospital after loss of consciousness and limb shaking lasting 1 min. Witnesses reported confusion after he regained consciousness. The event was preceded by sudden onset of dyspnea and inspiratory chest pain at rest. He endorsed 5 days of dry cough diagnosed as bronchitis and 2 years of exertional chest pain and dyspnea. Home medications were doxycycline, methylphenidate, and dexamethylphenidate. The patient's only medical history was attention-deficit/hyperactivity disorder diagnosed in elementary school. He was adopted as an infant. His mother died due to complications of an unspecified cardiac condition after delivery. He denied alcohol, tobacco, or illicit drug use. On presentation, the patient was alert and well-appearing. His temperature was 98.9 °F, heart rate was 112, and blood pressure was 158/111. Examination revealed a split S2 with loud pulmonic component and a 1/6 systolic murmur over the left sternal border. Lungs were clear to auscultation. Blood counts and metabolic panel were unremarkable. A CT angiogram found no pulmonary embolus, but demonstrated perivascular ground-glass opacities and marked enlargement of the main pulmonary artery, right ventricle, right atrium, and inferior vena cava. Symptoms resolved spontaneously 4 h after arrival. The patient was discharged with cardiology follow up, where echocardiography revealed a dilated, hypokinetic right ventricle with systolic pressure of 120 mmHg. Right heart catheterization confirmed severe pulmonary hypertension and cardiac index 1.76 L/min/m². Methylphenidate and dexamethylphenidate were discontinued. Continuous treprostinil was started. He was hospitalized three more times in 5 months with similar symptoms. Repeat catheterization found no improvement of pulmonary vascular resistance. Six months ago treprostinil was increased to the maximum recommended dose. He has remained free of hospitalizations since then despite lifestyle-limiting chest pain and dyspnea.

DISCUSSION: According to the CDC's 2011 National Survey of Children's Health, 11.0 % of US children between ages 4 and 17 years are diagnosed with Attention-Deficit/Hyperactivity Disorder. Prevalence has increased from 7.8 % in 2003. More than 6 % are treated with stimulants. This patient was diagnosed with attention-deficit/hyperactivity disorder in elementary school and had been on stimulant medications for eleven years. Prior clinic notes documented concern about high stimulant doses, although his regimen always fell within recommended dosing guidelines. One third of patients with idiopathic pulmonary hypertension report prior amphetamine or cocaine use. The odds ratio for prior stimulant use was 10.14 in patients with idiopathic disease compared to patients with known risk factors. A pathogenic mechanism linking stimulant use and pulmonary vascular disease has not been discovered. Proposed mechanisms include toxic endothelial injury, hypoxic insult, direct spasm, vasculitis, and dysregulation of vascular tone mediators. Amphetamines increase serum levels of serotonin, which is both a pulmonary vasoconstrictor and pulmonary artery smooth muscle mitogen. Stimulant medications carry a warning label recommending that anyone being considered for their use undergo screening for family history of sudden death or ventricular arrhythmia and physical examination to screen for cardiopulmonary abnormalities. Patients who develop exertional chest pain, syncope, or other symptoms suggestive of cardiac disease should undergo immediate cardiac evaluation.

THE MENINGITIS THAT WASN'T Sonali Advan²; Sumant Arora¹; wickliffe Many². ¹UAB Montgomery Health Center, Montgomery, AL; ²University of Alabama at Birmingham, Montgomery, Montgomery, AL. (Tracking ID #2200180)

LEARNING OBJECTIVE #1: To understand that the underlying immunodeficient state in patients with sarcoidosis puts them at risk for opportunistic infections.

LEARNING OBJECTIVE #2: To rule out other etiologies of chronic meningitis in sarcoid patients with neurologic findings suggestive of neurosarcoidosis.

CASE: We report a case of a 41-year-old man with a 6-year history of sarcoidosis who presented with complaints of generalized weakness, progressive dysphagia (solids > liquids), and hoarseness for 1–2 weeks. Review of systems was positive for moderate dyspnea, nausea, and unintentional weight loss (14 lbs) over 6 months. On exam, he was cachectic and in moderate distress. He was afebrile, tachycardic and tachypneic but saturating well on room air. Pertinent positive physical exam findings included neck stiffness and drowsiness on presentation, rest of the neurologic exam was within normal limits. Complete blood count and serum electrolytes were normal, except for mildly elevated bicarbonate. HIV screen, sputum and blood cultures were negative. Chest imaging showed stable bilateral extensive reticulonodular ground glass opacities. Lumbar puncture was performed which revealed clear colorless cerebrospinal fluid (CSF) with opening pressure of 20 cm of water, elevated protein (227 mg/dl), low glucose (13 mg/dl), 20 WBCs/mm³ (90 % mononuclear), but negative CSF gram stain, bacterial and Acid fast bacilli cultures. Testing for cryptococcal antigen was not done, but fungal cultures were pending at the time. During his hospital stay, patient failed all swallow evaluations including barium swallow evaluation. He underwent endoscopy for evaluation of his dysphagia, which showed a normal esophagus, normal antrum and body of the stomach. It was felt that further workup should be done for evaluation of his dysphagia. As his dysphagia failed to improve, eventually a percutaneous endoscopic gastrostomy (PEG) tube was placed. Magnetic resonance imaging (MRI) of the brain revealed enlarged temporal horn of the right lateral ventricle with multiple leptomeningeal implants and parenchymal lesions. Neurology and neurosurgery were consulted. A diagnosis of neurosarcoidosis was made, and he was treated with intravenous steroids, which led to clinical improvement. Follow up with serial CT scans were recommended and he was discharged on oral steroids. However, he returned within 2 weeks with high grade fever (102.9 F), headache, confusion, abdominal pain, and vomiting. Repeat lumbar puncture was done which revealed clear colorless fluid with an opening pressure of 18 cm of water, elevated protein (124 mg/dl), and low glucose (23 mg/dl). The cryptococcal antigen test was positive (1:1024) and cultures were positive for *Cryptococcus neoformans*. Induction phase therapy with amphotericin and flucytosine was initiated, and he was discharged home on maintenance therapy with fluconazole. His dysphagia improved with antifungal treatment and speech therapy, and his PEG tube was removed on discharge. Follow up MRI of the brain one month after discharge showed decrease in enhancement of lesions and edema.

DISCUSSION: Sarcoidosis is an idiopathic disease, characterized by non-caseating granulomas in various organs. Sequestration of CD4 cells in sarcoid granulomas affects cell-mediated immunity. Impairment of cell-mediated immunity and concurrent steroid therapy in sarcoidosis puts patients at risk for various opportunistic infections. Cryptococcal meningitis (CM) is an opportunistic fungal infection that often occurs in immunodeficient patients. CM is often misdiagnosed as neurosarcoidosis, because of similar clinical presentation as well as CSF picture. However, hypoglycorrhachia is more common in CM. Both CM and neurosarcoidosis are chronic meningitis, and can also co-exist in the same patient. In sarcoid patients with neurologic signs and symptoms, CM should be ruled out by Polymerase Chain Reaction on CSF samples, even if MRI findings point towards neurosarcoidosis. It is critical to evaluate these patients for other infectious and neoplastic etiologies prior to administering immunosuppressive medications or steroids for neurosarcoidosis. Serologic testing and brain biopsy should be considered to confirm the diagnosis prior to empiric treatment.

THE NOSE IS IN THE HEART OF IT Victoria Gutgarts^{1,2}; Rosemarie Conigliaro^{1,2}.
¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2199364)

LEARNING OBJECTIVE #1: Define chronic rhinosinusitis (CRS) and describe the pathophysiology and complications of the disease.

LEARNING OBJECTIVE #2: Recognize *Streptococcus pneumoniae* as a cause of CRS and pneumococcal endocarditis as a rare complication.

CASE: A 64 year-old man presented with ten days of subjective fevers and chills, bilateral lower quadrant abdominal pain, and a dry cough. Temperature was 101.9 F with a grade three out of six systolic murmur heard best at the second left intercostal space. Initial white blood cell count was 31.4 k/uL; creatinine was elevated at 1.4 mg/dL. CT scan of the abdomen and pelvis revealed bilateral wedge shaped areas of decreased enhancement in both kidneys. Endocarditis was suspected. A vegetation was found at the aortic valve on transthoracic echocardiogram. Blood cultures grew *Streptococcus pneumoniae*, sensitive to ceftriaxone. Further history revealed that the patient has not felt "like himself" for over a year, with decreased appetite, fatigue, and a twenty pound weight loss. He recounted a history of multiple sinus infections involving purulent nasal discharge, facial pressure, with the most recent infection treated with antibiotics one year prior. CT scan of the sinuses

revealed a defect within the floor of the right maxillary sinus where a sino-oral fistula was present. Surgical repair was recommended, and patient was treated with 4 weeks of intravenous ceftriaxone for Pneumococcal endocarditis thought to be secondary to seeding from a chronic rhinosinusitis.

DISCUSSION: Chronic rhinosinusitis (CRS) is defined as an inflammatory disorder of the paranasal sinuses that lasts 12 weeks or longer. It is a common disease that affects roughly 15 % of people in the United States each year. In addition to the time course, two or more signs must be present to make the diagnosis, including nasal purulent discharge, nasal congestion, facial pressure, and/or reduction of olfactory senses. CRS has been classified into three subtypes; CRS with nasal polyposis, CRS without nasal polyposis, and allergic fungal rhinosinusitis (AFRS). CRS without nasal polyposis is the most common, comprising roughly 60 % of cases. CT imaging often shows sinus opacification or obstruction with nonpolypoid mucosal thickening. Studies have suggested bacterial biofilms to be the mechanism of disease. Biofilms are aggregates of bacteria that irreversibly adhere to mucosa and form a protective outer layer of cells, which allow them to become resistant to host defenses and antimicrobial agents. The most common bacterial causes of CRS include *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. Complications of CRS may be caused by local extension, leading to meningitis, otitis, or orbital cellulitis. Recurrent inflammation of the sinuses may also form fistulas, and result in bacteremia and systemic diseases such as endocarditis. During the preantibiotic era, *Streptococcus pneumoniae* endocarditis was seen in roughly 15 % of cases. After penicillin became available, the incidence fell to 1 to 3 %. *Streptococcus pneumoniae* endocarditis tends to have an aggressive evolution, often with high mortality. The aortic valve is preferentially affected, which has a higher frequency of complications as compared to other valves. Treatment involves weeks of intravenous antimicrobial therapy, often with penicillin if sensitive, and management of the underlying cause. Recognition and early treatment of recurrent sinus infections is crucial in preventing local and systemic complications such as endocarditis.

THE SOMETIMES DEVASTATING NEUROLOGICAL SEQUELAE OF SLE
 Nicholas Joza. Tufts Medical Center, Boston, MA. (Tracking ID #2200162)

LEARNING OBJECTIVE #1: Appreciate the neurological complications of SLE

LEARNING OBJECTIVE #2: Understand that transverse myelitis has a wide spectrum of etiologies, which requires prompt exclusion of reversible causes

CASE: A 22 year-old man with history of systemic lupus erythematosus (SLE) with renal involvement, who had been well-controlled for years on Cellcept and prednisone, was admitted for acute onset of lower extremity paralysis. Four days earlier he presented with headache, fever and myalgias. Spinal tap at that time revealed pleocytosis with neutrophilic predominance. MRI brain was unremarkable. His headache and fever spontaneously resolved without antibiotics, a presumed diagnosis of viral meningitis was made, and he was discharged. One day later, he developed acute lower extremity weakness bilaterally which progressed over hours to paraplegia and urinary retention, and he was readmitted. Examination revealed 0/5 muscle strength and areflexia in the lower extremities, and a sensory level approximately at the umbilicus. MRI spine revealed T2 hyperintensity involving the thoracic cord from T7 extending to the conus medullaris, compatible with transverse myelitis. Labs were notable for elevated dsDNA and hypocomplementemia, consistent with lupus flare. An extensive infectious workup was unrevealing. He was started on pulse dose steroids and Cytoxan, and underwent plasmapheresis. At 3 months, he had largely regained the ability to ambulate, though continued to complain of residual lower extremity pain and urinary incontinence.

DISCUSSION: Although neuropsychiatric manifestations of SLE are common, transverse myelitis (TM) occurs in only 1 to 1.5 % of these patients [1]. Acute TM is a spinal cord inflammatory disorder characterized by rapid onset of paresis, a sensory level and bowel and bladder dysfunction. The differential diagnosis of TM is very broad and includes infection (eg. West Nile virus, herpes, Lyme disease), a systemic autoimmune disorder, a paraneoplastic syndrome, or a multifocal neurologic disease (eg. multiple sclerosis) [2]. A spine MRI is crucial to exclude mimics of TM such as neoplasms and vascular myelopathies, and typically reveals a gadolinium-enhancing signal abnormality. CSF analysis often reveals a moderate pleocytosis and elevated protein level. In our patient, there was initial diagnostic uncertainty when he presented with headache and fever—did this represent an infectious meningitis in the setting of immunosuppression or a new manifestation of a lupus flare? Indeed, these prodromal symptoms typically herald the onset of an SLE myelopathy [2]. Subsequent CSF analysis failed to point to an infectious cause. Early initiation of potent immunosuppression was crucial, and leads to the best chance for recovery. **References:** 1. Saison, J. et al. Systemic lupus erythematosus-associated acute transverse myelitis: manifestations, treatments, outcomes, and prognostic factors in 20 patients. (2014). Lupus. Aug 12, 2014 issue. 2. Beh, S. C., et al. Transverse myelitis. (2013). Neurol Clin 31: 79–138.

THE UNUSUAL SUSPECT: A RARE AND MORBID CAUSE OF ACUTE POST-PARTUM CHEST PAIN Anand D. Jagannath; David B. Gomez; Martin Cohen; Sheira Schlair. Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY. (Tracking ID #2199094)

LEARNING OBJECTIVE #1: Recognize unique features of coronary artery vasospasm and available treatments

LEARNING OBJECTIVE #2: Identify pregnancy-related risk factors contributing to coronary artery vasospasm

CASE: A 36 year old woman presented with sudden-onset, 8/10, dull, midsternal chest pain that radiated to the back 2 weeks after elective Cesarean section and an uncomplicated pregnancy. There was no associated shortness of breath, palpitations, diaphoresis, lightheadedness, nausea, vomiting, diarrhea, or fever. The pain resolved without intervention within 15 min of onset. Blood pressure was 172/93, which improved with nifedipine, and the patient was discharged home. The patient returned the following day with concern for post-partum pre-eclampsia after blood pressure was again elevated at outpatient follow up. A short, 2/6 non-radiating systolic murmur was heard loudest at the base. New, pronounced T-wave inversions were noted in leads I, II, aVL, V2-V6. Peak troponin-T was 0.13 ng/ml, peak CPK 174 U/L, and pro-BNP 994 pg/ml. No pulmonary embolism was seen on ventilation-perfusion scan. Cardiac catheterization revealed diffuse vasospasm in the mid to distal left anterior descending coronary artery and focal 30 % vasospasm in the mid left circumflex coronary artery, with a left ventricular ejection fraction of 40 %. Vasospasm responded to intracoronary (IC) nicardipine. Left circumflex vasospasm initially worsened to 80 % stenosis but eventually improved with sedation and continued IC nicardipine. The patient was discharged two days later, symptom-free, on oral nicardipine and enalapril, with return of ejection fraction to 60 % at outpatient cardiology follow-up.

DISCUSSION: Chest pain is a frequent complaint assessed by the internist. Though myocardial infarction (MI) and pulmonary embolism are common differentials, coronary vasospasm is a potentially morbid diagnosis worth considering. The pathophysiology of coronary vasospasm is thought to involve endothelial dysfunction and hyperreactivity of coronary artery smooth muscle cells. Certain aspects of the history may help the internist differentiate between typical angina and coronary vasospasm. Most patients with vasospasm are under 50 years of age, do not have cardiac risk factors, or have a history of drug abuse (e.g. cocaine). Chest pain is not brought on by exertion however hyperventilation can provoke "attacks". Physical examination is not revealing; however, some patients will be hypertensive, tachycardic, or diaphoretic during episodes. EKG is essential for diagnosis and should be obtained during and also following chest pain episodes. Transient ST segment elevation during a chest pain episode is the classic electrocardiographic finding in coronary vasospasm resulting from transient transmural myocardial ischemia. ST depression and negative U waves may also be seen, likely related to the severity of vasospasm and resultant degree of myocardial ischemia. Coronary angiography is essential in any patient suspected to have coronary vasospasm to confirm the diagnosis and to rule out fixed obstruction. Therapeutic options in confirmed cases include calcium channel blockers and nitrates with the former class independently predicting MI-free survival in one study. In the acute setting, intra-coronary delivery of these drugs, as in our case, can relieve spasm and may have survival benefit especially in patients with concurrent severe CAD or multi-vessel spasm. Of particular relevance to internists is that long-term disease management is enhanced by statin use and smoking cessation. In fact, long-term MI-free survival may be improved with these two interventions. Coronary vasospasm in pregnancy and the post-partum period is uncommon. A report of 208 cases of pregnancy-related acute MI found only 1.8 % of cases caused by coronary vasospasm. Post-partum uterine hypoperfusion causes an increase in angiotensin II which can trigger vasospasm. Pre-eclampsia and eclampsia have been postulated to cause systemic and coronary vasospasm mediated by endothelial dysfunction leading to myocardial ischemia. Drugs frequently used in pregnant or post-partum women such as ergonovine, bromocriptine, and prostaglandin E2, are also known to cause coronary vasospasm via unclear mechanisms. Of the published cases of post-partum coronary vasospasm, most have occurred within 2-4 weeks of delivery though reported cases more than 5 months from delivery make post-partum vasospasm relevant to the internist. This case highlights several features important to the internist for diagnosing and treating coronary vasospasm. First, coronary vasospasm should be considered in "atypical" patients presenting with typical angina and rapidly triaged to initiation of empiric treatment if typical EKG findings are present. Second, long-term therapy with calcium channel blockers likely improves ischemia-free survival. Finally, internists should give special consideration for coronary vasospasm in post-partum patients presenting with chest pain.

THROMBOSIS IN A BLEEDING DISORDER Sheryl K. Ramdass; Leslie Howard. Baystate Medical Center, Springfield, MA. (Tracking ID #2197446)

LEARNING OBJECTIVE #1: Recognize patients with a bleeding disorder can be at risk of thrombosis

LEARNING OBJECTIVE #2: Discuss challenges in managing FVII deficient patients including anticoagulation therapy

CASE: A 73 year old man presented with an episode of chest tightness, dyspnea and pre-syncope one month after a right femoral neck fracture requiring internal fixation. CT angiogram of the chest demonstrated multiple bilateral filling defects involving the lobar, segmental and sub-segmental pulmonary arteries of all lobes, consistent with pulmonary emboli. Doppler ultrasounds of the lower extremities revealed bilateral deep venous thromboses. His past medical history was significant for factor VII deficiency (FVIID), diagnosed elsewhere at age 44 following incidentally noted abnormal coagulation testing. He had never experienced significant bleeding episodes. He had no family history of bleeding disorders. He had received a single prophylactic dose of recombinant Factor VIIa prior to cataract surgery and dental extractions with no bleeding complications. Laboratory testing prior to his recent hip surgery was significant for PT 27.8 s (ref. range 9.7-12.2 s), INR 2.7, PTT 25.9 (ref. range, 24.1-33.1 s) and factor VII activity level <5.0 % (ref. range, 50-200 %); no inhibitor was present. He received recombinant Factor VIIa 20ug/kg immediately prior to surgery as well as every 8 h postoperatively for a total of 4 doses. PT corrected to 8.8 s, INR 0.9 and factor VII activity level >200 %. There was minimal blood loss during surgery and no postoperative bleeding. He did not receive postoperative prophylactic anticoagulation. Following the diagnosis of venous thromboembolism, he was started on standard doses of intravenous unfractionated heparin followed by subcutaneous low molecular weight heparin (LMWH) 1U/kg twice daily. His anti-factor-Xa level measured 4 h following administration was 0.91 IU/ml (ref. range, 0.6-1.1 IU/ml). Since the thromboses were provoked, 3 months of anticoagulation was planned and following 2 months of therapy he had not experienced bleeding.

DISCUSSION: Activated FVII binds to tissue factor exposed by vascular injury and initiates coagulation through the extrinsic pathway. FVIID is the only congenital bleeding disorder characterized by an isolated prolongation of PT, corrected by administration of plasma. FVIID, the most frequent among the rare inherited bleeding disorders, accounts for one symptomatic individual per 500 000 population.¹ Clinical manifestations are heterogeneous ranging from no symptoms to mild mucosal bleeding to life threatening hemorrhage.^{2,3} There is a poor correlation between FVII coagulation activity (FVII:C) and bleeding tendency^{4,5} leading to difficulty in predicting bleeding risk, hence specific guidelines on preoperative management are lacking. This is exemplified by our patient whose baseline FVII:C level was <5 % but he had no prior history of bleeding. Additionally thrombotic events have been reported to occur paradoxically in bleeding disorders. In FVIID, thrombosis is mainly venous with a reported incidence of 3-4 %.⁶ Although spontaneous thrombosis is extremely rare, severe FVIID is not protective from strong thrombosis risk factors such as surgery and replacement therapy especially activated products.^{4,5,6} Our patient had both these risk factors; he underwent orthopedic surgery as well as received activated FVII preoperatively. Literature on anticoagulation (AC) strategies suitable for FVIID individuals with thrombosis is not well established. It remains a challenge to find an effective AC that carries a low bleeding risk as well as thrombosis recurrence. The baseline INR is elevated in FVIID and therefore this precludes the use of oral vitamin K antagonist with monitoring INR for management of thrombosis. Alternatively, factor II levels may be monitored as a measure of antithrombotic protection⁷, however the assay time is long. Furthermore, evidence for other recommended AC agents is sparse in this population group. Limited literature suggest heparin may be safe with monitoring of anti-FX activity as an indicator of optimal antithrombotic therapy.^{4,8} Our patient was started on intravenous heparin and transitioned to LMWH on discharge without any reported bleeding episodes. In conclusion, the discerning clinician must be aware that thrombosis can occur in FVIID under certain provoked circumstances and severe deficiency does not offer protection against thrombosis. Prophylactic AC therapy should be considered in patients with predisposing risk factors and therapeutic AC in cases of thrombosis can be safe, though future studies on the choice of AC is warranted.

TUBERCULOSIS IN A SINGLE LYMPH NODE PRESENTING AS FLANK PAIN Kathy M. Tran; Arthur A. Winer; Jennifer Liu; Jessica Taff. New York University Langone Medical Center, New York, NY. (Tracking ID #2196835)

LEARNING OBJECTIVE #1: Recognize that extraperitoneal tuberculosis, and particularly tuberculous lymphadenitis, can present as a single nodule and should be strongly considered in the appropriate clinical setting.

LEARNING OBJECTIVE #2: Identify classic imaging characteristics of tuberculous lymphadenitis.

CASE: A 45-year-old Peruvian male prisoner with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) presented with right flank pain, intermittent fevers, chills, and night sweats for 3 weeks. Prior to 7 months of incarceration, he traveled internationally throughout Central and South America and eastern Asia. He denied weight loss, abdominal pain, dysuria, or hematuria. He was never treated for his HIV. As a child, he received the Bacillus Calmette-Guerin vaccination, but had no known

exposure to tuberculosis. Sputum cultures and Quantiferon Gold were negative 3 weeks prior to presentation. On initial exam the patient was febrile to 101.3 °F with tachycardia to 112, with otherwise normal vital signs. The patient complained of R flank pain, however his abdomen and back were non-tender to palpation and there were no palpable lymph nodes on exam. Laboratory testing revealed a CD4 count of 24/μL, white blood cell count of 4100/mm³, hemoglobin of 12.3 g/dL, and hematocrit of 36.3 %. Other labs tests were within normal limits. Blood cultures showed no growth. Sputum for acid-fast bacilli was negative on three occasions but Quantiferon Gold assay was positive. Computed tomography (CT) of the chest was negative for pathology. CT of his abdomen and pelvis with contrast revealed a solitary enlarged retroperitoneal lymph node located posterior to the transverse duodenum (1.8×2.1×3.9 cm) with a central area of low attenuation. Endoscopic ultrasound was used to assist with biopsy the lesion given its precarious location. Ziehl-Neelsen stain of the specimen demonstrated numerous acid fast bacilli. Polymerase chain reaction assay was positive for *Mycobacterium tuberculosis*. The patient was started on rifampin, isoniazid, pyrazinamide, and ethambutol for treatment of tuberculosis and antiretrovirals for treatment of his HIV. He experienced resolution of symptoms within 1.5 weeks and was discharged without complications.

DISCUSSION: The differential diagnosis for an HIV patient with an isolated enlarged lymph node includes malignancy, infection, and inflammatory conditions. However, in patients with several known risk factors (incarceration, immunodeficiency and recent travel to endemic areas), tuberculosis should be strongly considered even in cases of atypical presentation. Isolated extra-pulmonary tuberculosis accounts for 21 % of tuberculosis in the United States, usually presenting as tuberculous lymphadenitis. Most (60 %) tuberculous lymphadenitis is localized to the cervical lymphatic region. Abdominal tuberculosis comprises only 12 % of extra-pulmonary tuberculosis although the rate is increased in patients with immunodeficiency. Within the abdomen, gastrointestinal and genitourinary tuberculosis are the most common, followed by tuberculous lymphadenitis. Isolated retroperitoneal lymph node enlargement in tuberculosis remains more rare, as most cases of tuberculous lymphadenitis present as several matted lymph nodes, often palpable on exam. CT imaging usually reveals low attenuating central necrosis with a hyper-attenuating area of rim enhancement, consistent with an inflammatory response. In our patient, CT revealed a central area of caseation without rim enhancement. Biopsy by EUS provided a minimally invasive method to help identify active tuberculosis in a solitary nodule at an atypical location with localized symptoms of flank pain. Therefore, in patients at risk for tuberculosis, biopsy of even a single lymph node must be pursued vigorously in order to establish a diagnosis and provide appropriate treatment for the patient.

VENTRICULAR TACHYCARDIA AS A PRESENTATION OF CHAGAS CARDIOMYOPATHY Jensen A. Law²; Rebecca Witt¹. ¹George Washington University, Arlington, VA; ²Medstar Georgetown University Hospital, Washington, DC. (Tracking ID #2194025)

LEARNING OBJECTIVE #1: Recognize and treat ventricular tachycardia.

LEARNING OBJECTIVE #2: Identify Chagas Disease as an etiology of cardiac arrhythmias

CASE: Fifty-six year old healthy man from El Salvador presented to the hospital after 3 days of pleuritic chest pain and 2 syncopal episodes. While in the ED, he had three episodes of sustained ventricular tachycardia. The first episode converted spontaneously to sinus rhythm. The second converted after the patient received an amiodarone bolus. The third required another amiodarone bolus and lidocaine. He was admitted to the CCU and started on an amiodarone drip. Myocardial infarction was ruled out with negative cardiac enzymes and the patient had a left heart catheterization that revealed mild apical hypokinesis and mild coronary spasm in the mid distal LAD, but normal ejection fraction and no significant coronary artery disease. A cardiac MRI was performed to further evaluate for a structural focus of VT. It demonstrated myocardial edema, wall motion abnormality, and delayed enhancement involving the lateral wall at the level of the mid cavity. Labs for infiltrative disease and myocarditis such as ACE levels and viral antibody titers were sent and the patient then underwent an EP study. The ventricular tachycardia was inducible but not able to be entrained due to self termination. No ablation was performed, and the patient received an ICD for secondary prevention. The patient was transitioned to oral amiodarone. He was discharged home to follow-up with cardiology. Laboratory results subsequently returned positive for Chagas disease.

DISCUSSION: Ventricular tachycardia (VT) is a potentially life-threatening arrhythmia, though presentation can range from mild symptoms such as palpitations, an abnormal chest sensation, lightheadedness, and weakness, to more significant symptoms resulting from hemodynamic instability causing syncope, angina, and cardiogenic shock. While there are multiple criteria to differentiate VT from supraventricular tachycardia with aberrancy, when there is uncertainty or instability, a wide complex tachycardia should be treated as VT until proven otherwise. In patients such as this one, who are hemodynamically stable, pharmacologic cardioversion may be attempted with amiodarone,

lidocaine, procainamide, or sotalolol. If antiarrhythmics are unsuccessful, or if the patient becomes unstable, external cardioversion is required. Ventricular tachycardia most commonly occurs as a result of structural heart disease, usually from coronary artery disease and prior myocardial infarction, making up approximately 70 % of cases in the United States. The evaluation to establish the type of heart disease present can include, in addition to coronary angiography, exercise testing, echocardiography, signal-averaged electrocardiogram, endomyocardial biopsy, or MRI. This patient's MRI was consistent with myocarditis, and given the patient's exposure in El Salvador, *Trypanosoma cruzi* serologies were ordered and returned positive. Chagas disease is caused by *Trypanosoma cruzi*, a protozoan parasite endemic from the southwestern United States to central Argentina and Chile, and transmitted by the Triatominae. The acute phase can cause severe acute disease, such as acute myocarditis, pericardial effusion, or meningoencephalitis, but more commonly, patients are asymptomatic or have mild nonspecific symptoms such as malaise, fever, or anorexia. Chronically, patients can develop heart disease and gastrointestinal disease. Cardiac disease is more common than gastrointestinal, and patients frequently develop cardiac arrhythmias, as in this patient. The role of antitrypanosomals in chronic disease is limited, and management is focused on supportive care. Antiarrhythmics and optimization of medical therapy for heart failure are the mainstay of treatment of Chagas, with ICD placement for secondary prevention as indicated.

VISION LOSS: A UNIQUE PRESENTATION OF SLE WITH CONCOMITANT CATASTROPHIC ANTIPHOSPHOLIPID SYNDROME (CAPS) Brian Hachey; Hassan I. Ahmad; David Paje; Niral M. Patel; Ruchira Sengupta; Bronwyn L. Small. Henry Ford Hospital, Detroit, MI. (Tracking ID #2198969)

LEARNING OBJECTIVE #1: Diagnoses and Treatment of Antiphospholipid and Catastrophic Antiphospholipid Syndrome

CASE: The patient is a 21 year-old female presenting with headache and decreased vision over 1 week. She had no history of trauma. Physical exam was pertinent for an apical holosystolic murmur, right eye blindness with left eye inferior temporal and nasal deficiencies. A fundoscopic exam was consistent with central retinal artery occlusion. Labs were significant for a platelet count of 115, 000/μL, creatinine of 1.56 mg/dL and partial thromboplastin time of 56 s. A hypercoagulable and autoimmune work-up was positive for ANA and anticardiolipin IgG. A genetic hypercoagulable work-up (Factor V, Protein C/S) was negative. Imaging with CT head revealed parieto-occipital lobe infarct, determined on MRI to be multiple embolic infarcts to bilateral cerebral and cerebellar hemispheres. A transesophageal echocardiogram (TEE) demonstrated severe mitral regurgitation (MR) with mitral leaflet thickening and leaflet mass concerning for Libman-Sacks Endocarditis. The patient was diagnosed with systemic lupus erythematosus (SLE) meeting 4 SLICC criteria (alopecia, thrombocytopenia, positive ANA and anti-smith). The constellation of symptoms with multi-organ involvement in <1 week led to the diagnosis of CAPS. The patient was evaluated by ophthalmology for central retinal artery occlusion (CRAO); neurology consulted for embolic stroke; and both cardiology and cardiac surgery for valvular disease. The patient received methylprednisone 1 g IV daily for 3 days, which was continued as prednisone 15 mg daily. A Heparin drip was initiated with bridge to Coumadin targeting an INR of 2–3. Aspirin 81 mg daily was initiated given high risk for cerebrovascular events. Ophthalmology preformed pan-retinal photocoagulation x2 for CRAO and the patient's vision remained stable thereafter. At time of discharge approximately 3 weeks after initial presentation creatinine had returned to baseline. Patient continued to follow-up with multiple subspecialists as an outpatient. She was started on steroid-sparing agent mycophenolate mofetil with tapering prednisone. Given the severity of retinal disease on presentation she was deemed a poor candidate for hydroxychloroquine given the side effect profile. Cardiothoracic surgery performed mitral valve repair for prolapse leading to severe regurgitation. At 9 month follow-up the patients vision remained unchanged without evidence of new thrombotic events.

DISCUSSION: Systemic lupus erythematosus (SLE) is a heterogeneous autoimmune disease characterized by multi-organ system involvement. Lupus patients can present with simple constitutional symptoms or organ specific complaints. Many of these specific complaints, (e.g. oral ulcers, joint pains, malar rash) are characteristic features defined in clinical criteria for formulating a diagnosis. Along with clinical criteria there are laboratory criteria, including antiphospholipid antibodies (APL). While the laboratory presence of APL alone in a patient may be clinically insignificant; however when there is evidence of thrombosis (i.e. venous/arterial thrombosis or unexplained pregnancy morbidity) in conjunction with APL positivity, this establishes the diagnosis of Anti-Phospholipid Syndrome (APS). Patients with SLE and APL are at an increased risk of thrombotic complications. Although commonly associated with SLE, APS can occur either as an independent clinical syndrome (Primary APS) or associated with other autoimmune disorders (e.g. SLE, rheumatoid arthritis). Treatment of SLE with hydroxychloroquine has been well established as being thromboprotective by reducing thrombotic events. Of patients diagnosed with APS a small subset may be affected by a rare and aggressive variant known as catastrophic antiphospholipid syndrome (CAPS). CAPS is defined by evidence of

thrombosis involving 3 or more organs, development simultaneously or in <1 week, confirmation by histopathology of small vessel occlusion and lab confirmation of APL antibody. Given the widespread thrombotic disease there is an associated high mortality of CAPS up to 46 %. Of those that survive the initial event, recurrence rate of thrombosis approximates 20 %; however it is rare to have recurrence of CAPS related (multi-organ) thrombosis. In patients with CAPS, glucocorticoid therapy and long-term anticoagulation are the foundation of therapy. Current treatment recommendations support the use of heparin as bridge to warfarin to target INR 2–3. High dose intravenous glucocorticoids are used during the initial three days with transition to oral maintenance steroids. In patients resistant to these therapies additional proposed treatments include plasma exchange, which has shown therapeutic benefits and improved survival. At present time a precise treatment strategy for CAPS requires further investigation and therapy may need to be individualized based on severity of symptoms and patient risk factors.

WHEN IVC FILTER FAILS TO FILTER: A CASE OF RECURRENT PULMONARY EMBOLISM AND INTRAATRIAL CLOT STATUS POST IVC FILTER PLACEMENT Bilal Shaikh⁴; Asad Jehangir⁴; Anam Qureshi⁵; Qasim Jehangir¹; Andrew C. Rettew²; Ahmed Salman²; Shoaib Fareedy³; Manoj Singla². ¹Rawalpindi Medical College, Rawalpindi, Pakistan, Lahore, Pakistan; ²Reading Health System, Wyomissing, PA; ³Reading Health System, Reading, PA; ⁴Reading Health System, West Reading, PA; ⁵King Edward Medical University, Lahore, Pakistan. (Tracking ID #2197836)

LEARNING OBJECTIVE #1: Recognize the possibility of recurrence of pulmonary embolism (PE) in patients presenting with shortness of breath after the placement of IVC (inferior vena cava) filters.

LEARNING OBJECTIVE #2: Be prepared for the worse: include not only recurrent PE but also widespread intravascular thrombus with clogged filter in the differential of such cases.

CASE: A 74-year-old male presented to the emergency department with complaints of pleuritic midsternal chest pain and worsening shortness of breath for the past 1 week. He had a past medical history of recurrent PE and deep venous thrombosis with recent discontinuation of warfarin in the last 6 months after gastrointestinal bleeding from a duodenal ulcer with subsequent placement of Vena Tech permanent IVC filter. On examination, he was hemodynamically stable with a benign examination of the cardiovascular and pulmonary systems. The EKG showed normal sinus rhythm without any evidence of acute coronary syndrome or SIQ3T3, and troponin was normal. Computerized tomography of the chest/abdomen/pelvis with intravenous contrast revealed bilateral acute pulmonary emboli with moderate clot burden. Moreover, an elongated faint 2.7 cm × 4.5 cm filling defect within the inferior vena cava extending beyond the superior margin of the IVC filter compatible with intravascular thrombus was visualized. Transthoracic echocardiogram was performed which revealed preserved ejection fraction, a clot originating from the IVC filter and extending 2 cm into the right atrium, and aneurysmal interatrial septum with stretched patent foramen ovale (PFO). The patient was started on IV heparin and bridged to warfarin, which he tolerated well without any evidence of hemorrhage. He was evaluated by cardiothoracic surgery, vascular surgery, and interventional radiology who recommended continuing lifelong anticoagulation because of high risks involved with the manipulation of interatrial clot. He was discharged home in stable condition with a therapeutic INR, and repair of PFO as well as possible removal of IVC filter was advised after the resolution of the clot.

DISCUSSION: Recurrence of pulmonary embolism after placement of IVC filter is an uncommon phenomenon, which has been reported in 1–4 % of the cases in various studies. This can occur via small clots passing through the filter or the collaterals around the filters, or direct extension of the clot through the filter. Rule out recurrence of pulmonary embolism in patients with history of IVC filter placement presenting with shortness of breath, especially in those who are not being anticoagulated. These patients may have a benign physical examination; hence a high degree of suspicion is warranted for timely diagnosis and effective management or there is a high risk of clinical deterioration. A multi-disciplinary approach is needed to devise the appropriate management plan which is dictated by various factors including the clot burden and hemodynamic status of the individual.

WHEN NORMAL IS ABNORMAL: IDENTIFYING VITAMIN B12 DEFICIENCY Rachel Solomon²; Jenny J. Lin¹; Aparna Sarin¹. ¹Mount Sinai, New York, NY; ²Mount Sinai Medical Center, New York, NY. (Tracking ID #2196125)

LEARNING OBJECTIVE #1: Recognize signs and symptoms of vitamin B12 deficiency in patients with history of alcohol dependence.

LEARNING OBJECTIVE #2: Diagnose B12 deficiency in the presence of a normal serum B12 level

CASE: A 56 year-old woman was seen for primary care follow-up after an emergency room visit where she had presented with a five-minute episode of dizziness and blurred vision. Her past medical history was significant for hyperthyroidism for which she was no longer taking medication. During the visit, the patient described one year of fatigue, weakness, shortness of breath, episodic pre-syncope and bilateral lower extremity paresthesias worsening over the past few months. She also acknowledged long-standing depression and disclosed a history of alcohol dependence (1 l of vodka / day) for the past 40 years. Physical exam was notable for mental sluggishness with an odd affect, photophobia and a slow, shuffling gait. Cranial nerves, strength, and sensation to light touch were grossly intact. Romberg and vibration sense were not checked. Review of labs drawn in the ER revealed normal TSH and a mild pancytopenia (hemoglobin 9.2, white blood cells 3.5, platelets 114) with macroovalocytes and hypersegmented neutrophils. Additional blood tests performed at the time of her visit showed a normal vitamin B12 level of 624 pg/mL and folate level of >25 ng/mL. Further blood work, however, revealed significantly elevated homocysteine (109 mmol/L, normal <11) and methylmalonic acid levels (8.44 mmol/L, normal <0.4) confirming a diagnosis of vitamin B12 deficiency.

DISCUSSION: Vitamin B12 deficiency is a reversible cause of bone marrow failure and demyelinating disease frequently seen in alcoholics and the elderly. A cofactor for methionine synthase and L-methylmalonyl-coenzyme A mutase, vitamin B12 (cyanocobalamin) is needed for DNA and RNA synthesis and red cell production. It is also critical for the myelination and maintenance of the central nervous system. Because cyanocobalamin cannot be manufactured by the body, it must be obtained through diet (in animal protein or supplements). Its uptake in the intestines depends on intrinsic factor (produced by gastric parietal cells) and absorption in the terminal ileum. The most common causes of vitamin B12 deficiency are lack of intrinsic factor (seen in pernicious anemia and atrophic gastritis), dietary deficiencies (particularly among chronic alcohol users or vegans), malabsorption syndromes (including Crohn's disease) and chronic use of medications including H2 blockers, proton pump inhibitors and metformin. Our patient presented with classic neurologic and hematologic findings. In addition to commonly seen paresthesias and gait instability, she displayed weakness, fatigue, altered mental status ("megaloblastic madness"), cognitive deficits and autonomic instability causing episodic postural hypotension. Consistent with a well-described inverse correlation between degree of neurologic dysfunction and anemia in B12 deficiency, her anemia was mild. Her blood count and smear showed typical hematologic findings of pancytopenia, macroovalocytes, and hypersegmented neutrophils. Patients may also present with pallor, edema, jaundice, impaired vibration sense or a positive Romberg test. Our patient also illustrates an important diagnostic conundrum: her B12 level was normal. Vitamin B12 assays are problematic largely due to issues isolating cyanocobalamin from its binding proteins (transcobalamin and intrinsic factor) and they have shown poor agreement across laboratories. False negative and false positive values occur in up to 50 % of tests. Given the limitations of existing assays, the B12 level alone is not sufficient to rule out deficiency in the setting of clinical abnormalities. In cases where serum B12 levels are normal or borderline (200–350 pmol/L) but there is a high suspicion for B12 deficiency, serum homocysteine and methylmalonic acid levels should be checked. Elevated levels of homocysteine and methylmalonic acid have been shown to be highly sensitive and specific for vitamin B12 deficiency. As is likely in our patient, hepatic stores of cyanocobalamin often delay symptom onset for 5–10 years from onset of deficiency. At diagnosis, patients require high dose repletion in the form of 1 mg daily, then weekly, then monthly intramuscular injections or 1–2 mg daily oral supplementation. Our patient showed rapid symptom response to injections and will likely benefit from oral supplementation for long-term maintenance.

A RARE CASE OF DEXTROCARDIA ASSOCIATED WITH AN ABDOMINAL AORTIC ANEURYSM Robby Singh. Wayne State University / DMC, Detroit, MI. (Tracking ID #2199394)

LEARNING OBJECTIVE #1: Recognize dextrocardia and its various subtypes

LEARNING OBJECTIVE #2: Appreciate the imaging findings of dextrocardia associated with an infrarenal abdominal aortic aneurysm

CASE: Sixty-seven year old male with a known history of dextrocardia, smoking, CABG, and coronary stenting had multiple admissions for chest pain syndrome. On one of those admissions, CT of the chest was performed after acute coronary syndrome was ruled out. The CT scan of the chest showed an infrarenal aortic aneurysm that measured 3.8 cm × 3.7 cm. Repeat CT of chest and abdomen was done one year later showed an infrarenal abdominal aortic aneurysm measuring 4.2 × 4.4 cm extending a length of approximately 7.5 cm. Both common iliac arteries also showed aneurysmal dilatation measuring 1.7 cm on the right and 1.6 cm on the left. Patient was referred to vascular surgery who assessed him stable to be followed as outpatient in a few months with repeat surveillance CT scans.

DISCUSSION: Dextrocardia is a rare congenital abnormality characterized by reversal of the position of the heart to the right side of the thoracic cavity. The incidence is estimated

to be about 1 in 12,109 pregnancies in the US. Situs inversus totalis is a rare congenital abnormality that is reported to occur in 0.0025–0.01 % of the population. Situs inversus has been reported in association with abdominal aortic aneurysm in one case but dextrocardia alone has never been reported in association with abdominal aortic aneurysm. We herein report an interesting case of dextrocardia with an abdominal aortic aneurysm. Dextrocardia is a very rare congenital abnormality and there are no reported cases of dextrocardia with abdominal aortic aneurysm in the medical literature. Though this patient had other risk factors for abdominal aortic aneurysm including smoking and atherosclerotic disease, it cannot be said with certainty if dextrocardia did have any relationship with the aneurysm. Should every patient with dextrocardia have a CT abdomen to rule out abdominal aortic aneurysms? At present, there is no literature to support it but we believe that the findings of this case warrant further discussions on the topic.

FATIGUE: A COMMON COMPLAINT WITH MULTIPLE MEANINGS Gene R. Conley; Tony Chon; Adam P. Sawatsky. Mayo Clinic, Rochester, MN. (Tracking ID #2198960)

LEARNING OBJECTIVE #1: Use the history and clinical presentation to better understand the meaning of “fatigue” as a chief complaint.

LEARNING OBJECTIVE #2: Perform age-appropriate, sequential evaluation based on the clinical presentation of fatigue, a common primary care complaint.

CASE: A 73-year-old man presented to clinic with the chief complaint of increasing fatigue that began insidiously and had been gradually worsening over the past 2 months. He was unable to identify any inciting factors. He described his fatigue as a generalized decrease in energy that prevented him from being active in his retirement hobbies. He did not experience any decreased desire to be active in his daily activities. He did not have any increased daytime sleepiness. Both he and his wife endorsed that he had 7 h of sleep per night, without any snoring or snort arousals. He awoke 1–4 times per night to urinate. He did not endorse any fevers, chills, weight loss, decreased appetite, night sweats, lightheadedness, shortness of breath, cough, chest pain or palpitations, melena, muscle weakness, joint or back pains, myalgia or symptoms of depression apart from decreased energy. During the initial evaluation, he was noted to have a long-standing history of sleep-disordered breathing diagnosed in the 1990's. He was unable to complete formal sleep study on more recent evaluation due to inability to sleep with any device placed on the body. In addition, he suffered from chronic sinusitis. He drank 5–7 oz of liquor per week and had a 10 pack-year smoking history, quitting 40 years prior to presentation. He was not on any new medications or over-the-counter medicines or supplements. He had normal heart, lung, thyroid and neurologic exams. Nasal passages were swollen and erythematous. There was no palpable lymphadenopathy or palpable organomegaly on abdominal exam. There was no peripheral edema. His hemoglobin was 12.9 with macrocytosis of 95.2. His erythrocyte sedimentation rate was elevated at 57. His vitamin B12, folate, thyroid-stimulating hormone, electrolyte panel and creatinine and liver enzymes were normal. At the initial visit, we discussed decreasing his alcohol intake, treating his chronic sinusitis with fluticasone and sleep hygiene, including limiting afternoon coffee and fluids in the evening. He returned to clinic in one month with worsening symptoms of fatigue. He had cut down on his alcohol intake to 1–2 drinks per week. His sinusitis was improved. He had implemented the sleep hygiene measures with no nocturia. Given his anemia and elevated erythrocyte sedimentation rate, along with his unimproved fatigue, serum and urine protein electrophoresis were obtained. These studies revealed an IgA lambda monoclonal gammopathy with an M-spike. A bone marrow biopsy was performed, which showed focal marrow involvement consistent with a B-cell lymphoproliferative disorder. A PET/CT revealed a hypermetabolic retroperitoneal mass and CT-guided biopsy revealed an indolent B-cell lymphoma.

DISCUSSION: This case highlights the complexity of diagnosis of fatigue, a prevalent complaint in primary care that has a multitude of potential etiologies. It is important to take a systematic approach, to avoid missing important clues to serious underlying disease. One proposed approach to the work-up of fatigue is the following: 1) Take a thorough history to understand what patient means by fatigue, which can mean shortness of breath, excessive daytime sleepiness, dizziness, muscle weakness or decreased desire to perform pleasurable activities. 2) Ensure that the patient has appropriate sleep hygiene, as one proposed definition for chronic fatigue is decreased energy that does not improve with adequate sleep. 3) With the history and physical exam, elicit clues that can lead to the underlying cause. The differential includes endocrine disorders, neurological disorders, infection, malignancies, psychiatric disorders, hematological disorders, liver disease, fibromyalgia and underlying sleep disorders. 4) Obtain appropriate laboratory testing based on the differential. Most useful initial laboratory tests are CBC, TSH, electrolyte panel with BUN and creatinine, ESR, liver enzymes. HIV testing should be obtained on all adults and hepatitis C screening for adults born between 1945 and 1965. 5) If chronic fatigue is worsening or not improving with treatment of potential inciting factors, reviewing the case again with the above differential in mind may help to elicit an underlying cause. 6) If no cause elicited for chronic fatigue, acknowledge the patient's

symptoms and frankly discuss the lack of diagnosis underlying their fatigue. Encourage physical activity and continued emphasis on sleep hygiene. Additional laboratory testing is not of high value. Finally, consider a diagnosis of chronic fatigue syndrome with long-standing idiopathic fatigue.

THE METAMORPHOSIS OF A HORSE INTO A ZEBRA: A CASE OF ATYPICAL SARCOIDOSIS Manaf Assafin; Anand Jagannath; Sheira Schlair. Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY. (Tracking ID #2200025)

LEARNING OBJECTIVE #1: Recognize the neurologic and cardiac presentations of sarcoidosis

LEARNING OBJECTIVE #2: Describe the workup for a patient with suspected sarcoidosis

CASE: A 41 year-old woman with a 20-year history of atrial flutter and hypertension presented with dysgeusia, xerostomia, and a 30-lb unintentional weight loss for 3–4 months with associated lower extremity edema. Subsequently she developed paresthesias over her right forehead and anterior right thigh. She denied any fevers, chills, night sweats, cough, arthralgias, exertional intolerance, or unilateral weakness. An electrocardiogram revealed a normal sinus rhythm with a left bundle branch block which had been previously present. Thoraco-lumbar magnetic resonance imaging (MRI) was performed which revealed massive supraclavicular, mediastinal, and hilar lymphadenopathy. A supraclavicular lymph node biopsy revealed non-caseating granulomas. An echocardiogram performed to evaluate her pedal edema revealed new systolic dysfunction with a LVEF of 30 %. Serum ACE level was elevated at 302 U/L (normal 8–53 U/L). Cardiac MRI was consistent with sarcoidosis. A diagnosis of sarcoidosis with neurologic and cardiac manifestations was made. She was started on oral prednisone therapy, with improvement in her xerostomia, dysgeusia, and paresthesias. She eventually underwent placement of biventricular implantable cardioverter defibrillator for primary prevention of sudden cardiac death.

DISCUSSION: Sarcoidosis is a multi-system disease that can present in a multitude of ways. Our patient did not present with classical pulmonary manifestations, but with a rare combination of peripheral neuropathies and pedal edema and was found to have advanced cardiac involvement with severe systolic impairment at the time of her diagnosis. This cadre and profundity of symptom burden is quite rare in her age bracket. Our patient represents the approximately 5 % of cases who present with neurologic involvement. Cranial mononeuropathies are the most common manifestation of neurosarcoidosis, as in the case of our patient. Other neurologic involvement may present with neuroendocrine dysfunction, encephalopathy, myelopathy, or aseptic meningitis. Similarly, 5 % of clinical sarcoidosis presents with cardiac involvement, which can manifest variably, ranging from asymptomatic disease to sudden cardiac death - including arrhythmias, pericardial disease, valvular heart disease, conduction disease, and heart failure, the latter two of which our patient suffered. Of particular note, she had been diagnosed with atrial flutter in her 20's, which may have been an initial manifestation of cardiac sarcoidosis heralding development of systolic dysfunction. Workup for suspected sarcoidosis includes a tuberculin skin test and a posteroanterior chest radiograph or chest CT. Biopsy of affected tissue consistent with non-caseating granulomas is usually required to confirm the diagnosis. In neurosarcoidosis, an effort should be made to locate extra-neural tissue for biopsy, with special attention paid to the skin, lungs, and lymph nodes, as neurodiagnostic testing is difficult and has low sensitivity. In cases of suspected cardiac sarcoidosis, a cardiac MRI or PET scan should be obtained to enhance disease detection and monitor response to therapy. Endomyocardial biopsy is controversial as it may not alter outcomes. For patients with symptomatic or progressive sarcoidosis, including neurologic disease or advanced cardiac involvement as in our patient's case, oral glucocorticoids are the mainstay of therapy, with immunomodulation in the longterm. Cardiac ejection fraction is monitored to determine medication titration. Internists often encounter diagnostic challenges when patients present with a broad constellation of seemingly unrelated multi-system symptoms and findings. As our case highlights, clinicians should consider atypical sarcoidosis when faced with an atypical multi-system syndrome.

ESCHERICHIA COLI THORACIC SPINE SPONDYLODISCITIS AFTER GENITOURINARY TRACT INFECTION Chiara J. Chong. Singapore General Hospital, Singapore, Singapore. (Tracking ID #2197462)

LEARNING OBJECTIVE #1: Recognise that genitourinary tract infections can cause thoracic spine spondylitis.

LEARNING OBJECTIVE #2: Manage pyogenic spine infections.

CASE: Two patients presented with similar complaints of subacute back pain and were both found to have thoracic spine spondylitis on radiological imaging. The first patient, Mr A, is a 74 year old gentleman with diabetes who complained of fever of one month's duration. This was accompanied by left sided loin pain. Total white cell count was 19×

10^9 /L, C-reactive protein 90.4 mg/L, prolactin 16.2 ug/L, and erythrocyte sedimentation rate 66 mm/h. Urine cultures did not reveal any bacterial growth, but blood cultures grew pan sensitive *Escherichia coli*. Computed tomography of the abdomen was suspicious for bilateral prostatic abscesses, T7/8 endplate destruction with perivertebral and right epidural soft tissue suggestive of infective discitis. Magnetic resonance imaging of the spine confirmed T7/8 osteomyelitis and discitis with mild cord compression. He subsequently underwent biopsy of the T7/8 inter-vertebral disc. Gram stain, aerobic cultures, acid fast bacilli smear and culture, tuberculous quantiferon returned negative for any growth. Histology showed mild chronic inflammatory infiltrate in keeping with chronic discitis. He was planned for a total of 6 weeks of intravenous cefazolin but was re-admitted in the fourth week of treatment for new onset bilateral lower limb weakness and numbness. During his second admission, repeat magnetic resonance imaging showed interval progression of the T7/8 infection with a new focus at the T9 body and worsening cord compression. He underwent early decompression laminectomy of T7-9 and was found intra-operatively to have cord compression secondary to epidural abscess. Intra-operative tissue culture, acid fast bacilli culture and tuberculous PCR returned negative. Histology showed lamellar bone and fibroconnective tissue. Post operatively he completed the planned duration of 6 weeks of antibiotics. Lower limb neurological power remained between two to three on the Medical Research Council score and he was started on intense physiotherapy. The second patient, Mr B, is an 81 year old gentleman with diabetes and a recent admission for extended spectrum beta-lactamase *E. coli* urinary tract infection and bacteremia. He was treated with 2 weeks of ertapenem and discharged well. He represented with lower back pain of 1 month duration, with no fever or neurological symptoms. Laboratory investigations were as follows: white cell count 9×10^9 /L, C reactive protein 79 mg/L, prolactin 1.5 mcg/L, erythrocyte sedimentation rate 140 mm/h. Magnetic resonance imaging showed T8/9 marrow infiltration with high T2 signal compatible with spondylodiscitis, without any evidence of cord compression. Similarly, he also underwent biopsy of the spine and tissue cultures grew *E. coli* sensitive to ertapenem and amikacin. He was planned for a total of 6 weeks of ertapenem and transferred to a step down hospital for further rehabilitation.

DISCUSSION: Both cases illustrate how genitourinary tract infections can give rise to spondylodiscitis of varying severity. Both patients have diabetes which is a known risk factor of spinal infection¹. They presented with classical symptoms of fever, back pain, limb numbness and neurological deficits.¹ Early recognition and surgery when indicated is crucial in limiting neurological progression. Spinal infections can be classified by infective organism into pyogenic or tuberculous infections. Biochemical features such as markedly raised white cell count, erythrocyte sedimentation rate and C reactive protein are suggestive of pyogenic infections.¹⁻⁴ Radiological features - location of abscess, contrast enhancement, site/ number/ position of vertebral involvement, degree of disc destruction, are useful in providing clues to the infective etiology. Pyogenic infections tend to affect the lumbar spine and tuberculous infections the thoracic spine. The above patients had both normal and markedly abnormal infective markers, and radiologic involvement of the thoracic (not lumbar) spine. This illustrates the importance of obtaining tissue cultures to determine etiology, so that appropriate treatment can be instituted. References 1. S-J Jeong, S-W Choi, Y-Y Youm et al. Microbiology and Epidemiology of Infectious Spinal Disease. J Korean Neurosurg Soc 2014;56(1):21-27. 2. Hadjipavlou AG, Mader JT, Necessary JT, Muffoletto AJ. Hematogenous pyogenic spinal infections and their surgical management. Spine (Phila Pa 1976) 2000;25:1668-79. 3. Legrand E, Flipo RM, Guggenbuhl P et al. Management of non-tuberculous infectious discitis. Treatments used in 110 patients admitted to 12 teaching hospital in France. Joint Bone Spine 2001;68:504-9. 4. Kyu Yeol Lee. Comparison of pyogenic spondylitis and tuberculous spondylitis. Asian Spine J 2014;8(2):216-223.

ROUTELLA ORNITHINOLYTICA BACTEREMIA IN THE SETTING OF BLADDER CANCER: A NOVEL PRESENTATION OF A RARE PATHOGEN Ramy Sedhom¹; Tanaya Bhowmick. Rutgers- Robert Wood Johnson, New Brunswick, NJ. (Tracking ID #2193523)

LEARNING OBJECTIVE #1: Recognize the association of *Routella ornithinolytica* bacteremia with malignancy.

LEARNING OBJECTIVE #2: Identify a novel presentation of a rare pathogen increasing awareness of its clinical importance.

CASE: Reported cases of *Routella* infections are well described for histamine poisoning following consumption of stale scombroid fish. *Routella* is a rare pathogen in human infection and bacteremia is infrequently reported. Risk factors include biliary pathology, particularly in the setting of malignancy. We report the first case of *Routella ornithinolytica* bacteremia associated with bladder cancer. A 60-year old male presented with fever, dysuria, and shaking chills of two days duration. Past medical history included DM II, HTN, HLD, and newly diagnosed bladder carcinoma. He denied any history of hepatic or biliary disease. Medications included metformin and Lantus daily. He reported a 60 pack-year smoking history and no recreational drug use. His father died of lung cancer.

He was diagnosed with bladder carcinoma 1 week prior to hospital admission following an episode of gross hematuria and urinary retention. Cystoscopy revealed a 10×14 cm mass at the left lateral bladder wall. At the time of admission, he complained of decreased oral intake for 3 days, shaking chills, lethargy, and generalized weakness. He denied abdominal pain, jaundice, easy bruising, or recurrence of hematuria. On admission, patient was afebrile, normotensive, with pulse 102, respiratory rate 30, and O2 sat 98 % on room air. Physical exam revealed dry mucus membranes and hypoesthesia of the bilateral lower extremities. There was no stigmata of chronic liver disease or presence of asterixis. Basic profile included mild acute kidney injury, with creatinine of 1.6, from baseline of 1. Blood sugar was 536 and an anion gap of 32 was noted. Lactate was 14.1. CBC was notable for a white count of 17.8, with neutrophil predominance and left shift. Platelets were 188. Hepatic function panel was within normal limits. Urinalysis was significant for 4+ glucose, 2+ blood, 3+ Leukocyte esterase, negative nitrites, and 45 WBC/HPF. There were rare hyaline casts and trace proteinuria. Urinary ketones were not present. Renal ultrasound did not show any abnormalities. The patient was admitted to the ICU for DKA and sepsis likely secondary to bladder pathology. He was empirically started on vancomycin and piperacillin/tazobactam. Two days following admission, gram-negative rods were found in the urine. His anion gap closed quickly on an insulin drip and AKI resolved with fluids. Urine culture was positive for *Routella ornithinolytica*. The bacillus was sensitive to levofloxacin, piperacillin/tazobactam, trimethoprim/sulfamethoxazole, tobramycin, and resistant to ampicillin. Bladder scans during hospitalization showed minimal urinary retention. Treatment was narrowed to levofloxacin to complete 14-day treatment. He was seen following discharge by urology for tumor staging and noted to be well. Of note, the biliary and portal system were within normal limits.

DISCUSSION: *Routella ornithinolytica* is a gram-negative aerobic bacillus belonging to the Enterobacteriaceae family. It rarely causes human infections. Of those reported, the majority of isolates are associated with gastrointestinal malignancy and biliary pathology. The patient reported was not on antibiotics, had no history of hepatic or biliary disease, and no recent biliary intervention. In addition, he had not eaten fish for over 6 months. With respect to antibiotic susceptibility, *R. ornithinolytica* has been known to be resistant to ampicillin. Our patient's case paralleled the literature. In almost all cases, the final diagnosis was biliary tract infection with bacteremia and no rash indicative of a histamine reaction. Further investigation is necessary to assess the importance and prognosis of *R. ornithinolytica* bacteremia. This is the first case of bacteremia in the setting of underlying bladder cancer to our knowledge. *R. ornithinolytica* remains a causative pathogen of infection in the immunocompromised and post-surgical patients, especially those with underlying malignancy.

MARIJUANA INDUCED BILARY DYSKINESIA Reem Al-Mahdawi¹; Larry J. McMann¹; Tiba Alwardi²; Maliha Naseer¹; Hussam Sabbagh²; Zain Kulaini¹. ¹Wayne State University, Rochester, MI; ²Wayne State University, Rochester Hills, MI; ³Wayne state university, Rochester Hills, MI. (Tracking ID #2197522)

LEARNING OBJECTIVE #1: Recognize that chronic marijuana usage can be an independent risk factor for biliary dyskinesia. Propose a possible mechanism based on the current literature and provide a platform for further investigation.

CASE: A19 year old female with no significant past medical history was admitted to our internal medicine service after being seen in the emergency room on two previous occasions in the prior week for abdominal pain, nausea, diarrhea, and vomiting. She had a social history significant for daily marijuana usage over the last 5 years. Work up during the first two presentations included a computed tomography (CT) of the abdomen which was negative. Labs were unremarkable. She was given antiemetics, narcotic pain medication and sent home with a diagnosis of gastroenteritis. On the day of her second discharge she returned 8 h later with severe nausea and vomiting. The patient reported that she now had severe colicky abdominal pain. Labs and vitals were unremarkable. Physical exam was positive for diffuse abdominal pain with palpation, worse in the right upper quadrant. An upper endoscopy was done which showed gastritis. She continued to have nausea and pain despite treatment. Surgery evaluation was obtained and a hepatic biliary scan was ordered. The results demonstrated a gallbladder ejection fraction of 19 %. She subsequently underwent a laparoscopic cholecystectomy and her symptoms of pain and nausea resolved.

DISCUSSION: Biliary dyskinesia related to cannabis use has never been reported in the literature. The patient in the above case is the first suspected case. In a study in 2001 they looked at the effect of CB1 cannabinoid receptors in rat hippocampal slices and it's effect on cholecystokinin (CCK) release. They concluded that activation of the CB1 receptors in the brain lead to less release of CCK which could contribute to learning and memory deficits. Many studies in the literature have pointed that cannabinoid receptor activation in the gut have lead to a decrease in peristalsis. We hypothesize that cannabinoid receptors in the gut inhibit CCK release and lead to biliary dyskinesia. In Conclusion, cannabis use and it's effects on the gastrointestinal system have focused primarily on it's anti peristaltic properties in the gut. Research and prevalence on the biliary dyskinesia associated with

cannabis has not been studied. This observation and hypothesis leads the way for a possible case series and further study.

5-FLUOROURACIL CARDIOTOXICITY MANIFESTING AS ST-ELEVATION MYOCARDIAL INFARCTION Krithika Krishnarao; Orestis Pappas; Moneal Shah; Indu Poomima. Allegheny General Hospital, Pittsburgh, PA. (Tracking ID #2196692)

LEARNING OBJECTIVE #1: Recognize cardiotoxicity in patients receiving 5-fluorouracil (5-FU)

LEARNING OBJECTIVE #2: Assess other options of chemotherapy in patients with underlying cardiac disease

CASE: We present the case of a 56-year-old Caucasian male with a previous history of atrial fibrillation on anticoagulation with rivaroxaban and recently diagnosed adenocarcinoma of the high rectum who presented with acute onset of left arm pain 3 days following initiation of chemotherapy with 5-fluorouracil, leucovorin, and oxaliplatin (FOLFOX). He did not have any other prior history of malignancy, treatment with anthracyclines, or previous radiation therapy to the chest. Plain radiographs of the elbow, radius, and ulna were negative for fracture or dislocation and his arm pain resolved. Electrocardiogram (ECG) revealed normal sinus rhythm with heart rate of 72 beats per minutes. His arm pain recurred and ECG was repeated, which showed new ST-segment elevation in leads I, II, aVL, V4-V6 consistent with acute anterolateral injury. Troponin I was elevated from 0.04 to 0.08 and he underwent emergent cardiac catheterization. Results showed 40–50 % stenosis of the mid left anterior descending coronary artery and 80–90 % stenosis of the first diagonal branch with Thrombolysis in Myocardial Infarction (TIMI) angiographic grade 3 flow. Left ventricular ejection fraction was 60 % with normal wall motion. Anticoagulation with heparin infusion was continued and he was transferred to the cardiac intensive care unit. The following morning, he developed left arm pain associated with nausea and diaphoresis. ECG was repeated and showed ST-elevation in I, II, aVL, V5, and V6. His symptoms resolved spontaneously and repeat ECG showed resolution of his ST-segment elevations. Given his transient symptoms and associated ECG changes, he was diagnosed with ST-elevation myocardial infarction secondary to coronary vasospasm. This was attributed to his recent initiation of chemotherapy with 5-FU, which has known cardiotoxic effects. Transthoracic echocardiography showed an ejection fraction of 35–40 % with moderate left ventricular systolic dysfunction, mild concentric left ventricular hypertrophy, and moderate to severe inferior wall hypokinesis. He was started on therapy with metoprolol succinate, lisinopril, spirinolactone, isosorbide mononitrate, atorvastatin and continued on rivaroxaban for anticoagulation for atrial fibrillation. His chemotherapy will be adjusted to exclude further use of 5-FU.

DISCUSSION: 5-fluorouracil (5-FU) is commonly used as a chemotherapeutic agent in the treatment of gastrointestinal malignancies. Cardiotoxicity, in the form of angina, myocardial infarction, cardiomyopathy, arrhythmias, and sudden cardiac death have been described with use of 5-FU in patients with and without underlying coronary artery disease. Although not well understood, coronary vasospasm, endothelial dysfunction, direct myocardial injury, and accumulation of toxic metabolites have been described as suggested mechanisms of cardiotoxicity. There have been case reports and studies describing the cardiotoxicity associated with 5-FU; however, it is not well recognized by clinicians. The common use of 5-FU as part of a chemotherapeutic regimen may pose a risk, especially in those with underlying coronary artery disease in whom the incidence of ischemia has been shown to be higher. Many cases have been described in those with no prior cardiac history, making it difficult to determine who would be more susceptible to the cardiotoxic effects of this agent. Markers of injury may need to be discovered to predict cardiotoxicity and guide therapy. Direct injury to the myocardium from some chemotherapeutic agents may lead to troponin elevation, which is not readily recognized. Jensen et al. (2010) showed N-terminal pro-brain natriuretic peptide (NT-proBNP) levels increased during FU therapy in a prospective study of 106 colorectal cancer patients. This may need to be explored further to discover more accurate measurements of predicting future cardiotoxicity. Although some effects may be reversible upon discontinuation of 5-FU, more serious adverse cardiotoxic effects have been described. There are also cases of recurrent cardiac events following re-challenge with 5-FU in those with reversible effects. Prophylaxis with vasodilators such as nitrates or calcium channel antagonists have shown inconclusive results in preventing cardiotoxicity. Chemotherapy may need to be adjusted, particularly in patients with underlying coronary artery disease, and newer chemotherapeutic agents may need to be discovered, which pose fewer cardiotoxic effects.

A 21-YEAR- OLD WOMAN WITH FEVER AND SORE THROAT: LEMIERRE'S SYNDROME WITH FUSOBACTERIUM NECROPHORUM BACTEREMIA Utibe R. Essien. Massachusetts General Hospital, Boston, MA. (Tracking ID #2193416)

LEARNING OBJECTIVE #1: Recognize the clinical features and diagnostic challenges of Lemierre's Syndrome.

LEARNING OBJECTIVE #2: Recognize and manage the complications associated with Lemierre's Syndrome.

CASE: A 21-year-old Saudi-Arabian woman with a past medical history of G6PD deficiency presented to an outpatient clinic with one day of subjective fevers, fatigue and left-sided throat pain. The patient denied any associated symptoms of cough, difficulty swallowing or dyspnea. The patient had not traveled to Saudi Arabia since arriving in the United States 3 months prior and denied any other local travel, tick or mosquito exposure or additional sick contacts. Clinical exam of the oropharynx revealed mild erythema without exudate. There was no cervical lymphadenopathy or tenderness appreciated. A rapid strep test was performed and was negative for streptococcus group A. The patient was sent home with antipyretics for a presumed viral upper respiratory infection. Six days later, the patient returned to the Emergency Department with persistent fevers, malaise, sore throat and a new non-productive cough. Her exam was notable for an ill-appearing woman, tachypneic and tachycardic with a heart rate in the 130 s and a blood pressure of 100/70. Her temperature was noted to be 101.4. Oropharyngeal exam remained unremarkable. Initial workup included an elevated white blood cell count of 12.7 K/uL with a neutrophilic predominance. Lab work was also notable for a negative heterophile antibody, Lyme titer, malaria antigen test, Ehrlichia DNA PCR, HIV-1 RNA PCR and viral respiratory panel. A chest x-ray was obtained and was normal. Urine and blood cultures were sent as the patient was admitted to the medical service for further management. On hospital day 2 the patient was noted to be acutely hypoxic, dropping her oxygen saturation to 88 % despite supplementation with a non-rebreather mask. A repeat chest x-ray was obtained which revealed diffuse bilateral interstitial opacities. The patient was started on ceftriaxone and azithromycin and transferred to the intensive care unit (ICU) for management of noncardiogenic pulmonary edema. On transfer to the ICU, preliminary blood culture data confirmed that 2/4 anaerobic bottles had grown gram-negative rods and the patient's antibiotic coverage was broadened to vancomycin and meropenem. On arrival to the ICU, the patient was intubated and placed on mechanical ventilation. Persistent hypotension necessitated the placement of a central venous catheter for vasopressor initiation. During catheter placement, a thrombus was seen on ultrasound of the left internal jugular vein. Of note, a computed tomography (CT) scan of the neck had been obtained the day prior with normal enhancement of all vascular structures reported. A CT of the chest also revealed cavitary subpleural lower lobe opacities concerning for septic emboli. A formal ultrasound was obtained which confirmed the presence of a partially occlusive thrombus along the posterior wall of the left internal jugular vein. A few hours later, the patient's gram-negative rod bacteremia was confirmed to be *Fusobacterium necrophorum*.

DISCUSSION: Lemierre's Syndrome (jugular vein suppurative thrombophlebitis) is an extremely rare cause of fever and sore throat in a young woman, with only a few case reports available in the literature. *Fusobacterium necrophorum* is the typical pathogen associated with the syndrome, and bacteremia with this organism is an uncommon complication of Lemierre's Syndrome. As such, it is important to recognize the key features of the syndrome including fevers, chills, exudative tonsillitis, sore throat, dysphagia, cervical lymphadenopathy and unilateral neck pain in the background of a preceding pharyngeal illness. Radiographic imaging to determine the presence of septic thrombophlebitis is essential to the diagnosis, and while evidence supports CT-scan of the neck with contrast as the key imaging tool, ultrasonography can be considered on the basis of its ability to identify and assess the extent of thrombus. The mainstay of management of the various complications of Lemierre's Syndrome, including bacteremia, meningitis and metastasis to the lungs, brain, heart, GI tract, kidneys and joints, is a prolonged (up to 6 weeks) course of antibiotics. While no clinical trials are available, carbapenem, a penicillin/beta-lactamase inhibitor combination, or metronidazole are recommended for antibiotic coverage.

A BIOPSY PROVEN IRREVERSIBLE TENOFOVIR-INDUCED RENAL TOXICITY PRESENTING AFTER 10 YEARS OF USE Javier Rodriguez Sanchez; Mark D. Faber; Norman Markowitz. Henry Ford Hospital, Detroit, MI. (Tracking ID #2196684)

LEARNING OBJECTIVE #1: Recognition of tenofovir-induced nephrotoxicity.

CASE: We describe a case of biopsy proven irreversible renal toxicity secondary to tenofovir. A 65-year-old African American 50 kg male with history of HIV, first diagnosed in 1991, treated with TDF, emtricitabine and nevirapine since 2004 presented to clinic with chief complaint of lower extremity swelling and difficulty concentrating. Physical exam was significant for fluid overload and decrease mentation. Initial laboratory studies revealed a creatinine of 24.4 mg/dL and BUN of 109 mg/d. The patient had a renal injury 6 months prior to his last known creatinine level, that resolved (creatinine 0.9 mg/dL and BUN 14 mg/dL on 11/2013) without further work up at that time. He is not diabetic, but has a history of well-controlled hypertension. On 11/2013 CD4 count had been approximately 900 cells/mm³ and HIV RNA undetectable. Urine microscopy revealed muddy brown granular casts consistent with acute tubular necrosis. TDF therapy was discontinued. Renal replacement therapy was started. Kidney biopsy was done confirming acute tubular necrosis and revealing global glomerulosclerosis, tubular atrophy and

interstitial fibrosis; electron microscopy reported tubular epithelial cells containing swollen and structurally abnormal mitochondria consistent with TDF-induced toxicity. Upon follow up; renal function did not improve. Renal replacement therapy was continued and kidney transplant evaluation was started.

DISCUSSION: Tenofovir (TDF) is a nucleotide reverse transcriptase inhibitor. In combination with other antiretroviral agents, TDF is the first line treatment for HIV-1 infection. It is the most prescribed antiretroviral and is the drug of choice in HIV and hepatitis B co-infection. Renal toxicity has been reported in only 0.5 % of patients on tenofovir but is being increasingly recognized. Risk factors include older age, preexisting renal impairment, uncontrolled HIV infection, low body weight and concomitant nephrotoxic medication use. The main adverse effect in tenofovir toxicity is in the proximal tubule cells secondary to the high mitochondrial activity of such cells. Clinical presentation is proximal tubular dysfunction with or without decrease in renal function. Most reported cases describe a generalized proximal tubular dysfunction consistent with complete or incomplete Fanconi's syndrome. Close monitoring of renal function and management of known risk factors are necessary yet not entirely sufficient for a proper renal function evaluation making prompt recognition of toxicity and discontinuation of the drug necessary. Tubular proteinuria precedes the decrease in renal function; reason why recent guidelines recommend at least biannual monitoring of renal function, serum phosphorus, proteinuria, and glycosuria to assist in the early recognition of tenofovir toxicity before renal function decreases. Additional testing might be considered to improve renal safety follow up including urine-beta 2 microglobulin and cystatin C. During renal biopsy; proximal tubular injury, ranging from diffuse and severe to mild and localized, was the major finding and the distinctive finding is prominent eosinophilic intracytoplasmic inclusions representing giant mitochondria with abnormal structure. The main line of treatment is discontinuation of tenofovir with renal recovery back to previous baseline observed in 50 % of the patients.

A BLEEDING HEART: CORONARY ARTERY BYPASS GRAFT IN THE SETTING OF IDIOPATHIC THROMBOCYTOPENIC PURPURA Ramy Sedhom; Jalal Baig; Charles L. Liu; Ranita Sharma. Rutgers-Robert Wood Johnson Medical School, Harrison, NJ. (Tracking ID #2195039)

LEARNING OBJECTIVE #1: Recognize the dilemma in treating acute coronary syndrome in the setting of idiopathic thrombocytopenic purpura.

LEARNING OBJECTIVE #2: Illustrate the absence of evidence based guidelines in treating ACS with low platelets.

CASE: Myocardial infarction in patients with chronic thrombocytopenia is rare. Dual antiplatelet therapy is integral to coronary stenting procedures. The coexistence of idiopathic thrombocytopenic purpura (ITP) poses serious challenges to this management strategy. Case reports describe success holding antiplatelet therapy and initiating thrombopoietic agents prior to coronary interventions. Published data to guide management is limited. We describe a case of ITP presenting with Acute Coronary Syndrome (ACS) with triple vessel disease. A 67-year old male presents with sub-sternal exertional chest pain, which progressed to pain at rest over a one month period along with progressive dyspnea of 1 week duration. There was no history of syncope, palpitations or lower extremity edema. He denied recent illness, constitutional symptoms, mucosal bleeding, easy bruising or a petechial rash. Past medical history includes ITP (platelets last known 40,000), hypertension, hyperlipidemia, schizophrenia and mental retardation. He does not take any medications. He denies smoking, drinking or illicit drug use. He lives and works on the grounds he maintains. He was estranged from his family. Surgical history includes successful inguinal hernia repair, pre-dating ITP diagnosed one month prior to presentation. Initial diagnosis of ITP responded to IVIG and prednisone. He was lost to follow up for several weeks. On admission, patient was afebrile, normotensive, with pulse 107, respiratory rate 17, and O2 sat 98 % on room air. Physical exam revealed a disheveled appearance, no evidence of JVD, clear lungs, non-displaced PMI, normal heart sounds, no murmurs, 2+ peripheral pulses and trace lower extremity edema. He was unable to participate in critical decision-making and guardianship through the courts was obtained. Renal function, PTT/INR and Hgb were normal. Basic profile was normal. Platelet count was 7000. Chest X-ray did not reveal mediastinal widening or pulmonary vascular congestion. Troponins were positive. EKG revealed sinus rhythm, with bi-atrial enlargement and new T-wave inversions in the anteroseptal leads. Cardiology and hematology were consulted for NSTEM co-management in the setting of ITP. Echocardiography revealed a dilated cardiomyopathy with global hypokinesis and EF of 20 %. Patient was classified as NYHA Stage III. Lisinopril, spironolactone, metoprolol and high dose atorvastatin were started. Aspirin and heparin were held due to thrombocytopenia. IVIG and prednisone were initiated to increase platelets. With consent, a femoral catheterization was performed and demonstrated stenosis in the mid LAD 99 %, LCX 80 % and RCA 99 %. The patient was a poor candidate for PCI due to compliance with dual antiplatelet therapy, even if for a brief period with bare metal stenting. Patient underwent a CABG with a platelet count of 124,000. After placement in a facility, longitudinal medical follow

up was established with a last platelet count, reported one year after presentation, of greater than 150,000.

DISCUSSION: ACS is rare in patients with ITP and precise recommendations for treatment are unavailable. A challenge exists due to conflicting goals in therapeutic management. The tendency to bleed due to both quantitative/qualitative deficiencies in platelets is a concern during cardiac interventions. Meanwhile, thrombolytic therapy is contraindicated in patients with ITP. Though case reports show success with bare metal stent placement, situations exist where adherence to medical therapy complicate management. In addition, no safe platelet cutoff is described. Our case describes success with CABG. However, a clinical trial is needed to better define optimal therapy in patients with co-existing thrombocytopenia.

A BONE TO PICK WITH TENOFOVIR: RECOGNIZING FANCONI SYNDROME AND OSTEOMALACIA AS SIDE EFFECTS Tanya Nikiforova²; Monica A. Gombert¹; R. Harsha Rao¹; Peter Veldkamp². ¹University Of Pittsburgh Medical Center, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2198675)

LEARNING OBJECTIVE #1: Identify nephrotoxicity as a common side effect of tenofovir and the importance of routinely screening patients on tenofovir for renal tubule dysfunction.

LEARNING OBJECTIVE #2: Recognize the clinical and diagnostic features of osteomalacia.

CASE: A 54-year-old woman with Human Immunodeficiency Virus (HIV) well controlled on over 10 years of emtricitabine/tenofovir/efavirenz (Atripla) and untreated Hepatitis C presents with one year of proximal muscle weakness and myalgias. She describes progressive difficulty ambulating, especially with rising from a seated position and walking up stairs, and severe pain in her hips, thighs, shoulders and right foot. On examination, she has decreased strength in her hip flexors (4/5) but normal strength in the rest of her upper and lower extremities, normal sensory exam, and 2+ symmetric reflexes throughout. She experiences pain with palpation of her upper thighs and shoulders bilaterally. Labwork is notable for a rising creatinine (1.2 to 2.0 over 3 months), hyperchloremic non-gap metabolic acidosis, hypophosphatemia (1.7), elevated alkaline phosphatase (258), and urinalysis with proteinuria, glucosuria, and hematuria. She has an elevated RF (73) but otherwise normal CPK, ESR, CRP, ANA, C3, C4, and anti-CCP levels. X-rays of her hips show sclerosis in the subtrochanteric regions concerning for subacute incomplete fractures (Looser's zones). X-rays of her right foot demonstrate subacute healing fractures in the first and third metatarsals. A bone scan shows multiple areas of increased bone turnover. Together, these findings suggest hypophosphatemic osteomalacia in the setting of Fanconi syndrome from tenofovir toxicity. The patient's tenofovir based regimen was changed to abacavir/lamivudine (Epzicom) and raltegravir (Isentress). She was started on calcitriol and phosphate repletion, and her renal function and phosphate levels normalized. Her symptoms of weakness and pain improved significantly over the next 2-4 weeks.

DISCUSSION: Tenofovir (TDF), a nucleotide reverse transcriptase inhibitor, is one of the first line medications for HIV treatment and is frequently used in the 'back bone' of antiretroviral therapy. More recently it is also being used to treat chronic Hepatitis B. The most common side effect of TDF is nephrotoxicity. Patients present with varying degrees of increased serum creatinine, hypophosphatemia, metabolic acidosis, and urinary wasting of glucose, protein, phosphate, and bicarbonate, a constellation known as Fanconi syndrome. While the incidence of overt renal failure is rare (<1 %), the frequency of proximal tubule dysfunction is common, with up to 20 % of patients affected in one prospective study. If unrecognized, renal wasting of phosphate can lead to hypophosphatemic osteomalacia, as identified in this patient. The HIV Medicine Association recommends screening patients on TDF every 6 months with serum creatinine, serum phosphate, and urinalysis for proteinuria and glucosuria. Osteomalacia is a metabolic bone disease characterized by decreased mineralization of the bone matrix. Commonly caused by vitamin D deficiency, it also occurs from phosphate wasting in proximal tubule disorders. Common clinical features include bone pain, muscle weakness, and fractures. Laboratory findings include elevated alkaline phosphatase, low serum calcium and phosphate, elevated PTH, and possibly low vitamin D levels depending on the etiology. The characteristic radiographic finding is pseudofractures, termed Looser's zones. While the gold standard for diagnosis is bone biopsy, the diagnosis can be made clinically, as in this patient. Treatment of osteomalacia includes correction of the underlying metabolic disorder and repletion of phosphate, calcium, and vitamin D. This case demonstrates an example of Fanconi syndrome leading to osteomalacia in the setting of tenofovir induced renal toxicity, and illustrates the importance of appropriately screening patients on TDF to prevent complications.

A CASE OF *STREPTOCOCCUS GALLOLYTICUS* MENINGITIS RAISING SUSPICION FOR COLORECTAL CARCINOMA Neal George, Conemaugh Memorial Medical Center, Johnstown, PA. (Tracking ID #2198785)

LEARNING OBJECTIVE #1: Recognize that *Streptococcus gallolyticus* can play a role in colon carcinogenesis.

LEARNING OBJECTIVE #2: Recognize that *Streptococcus gallolyticus* warrants workup to exclude underlying colon neoplasm.

CASE: An 84-year-old male with history of mechanical aortic valve replacement, sick sinus syndrome with pacemaker, and atrial fibrillation presented to emergency room with complaints of headache, confusion, and increasing lethargy over the last 48 h. At the time of admission, the patient was febrile with temperature of 38.9 °C and an elevated pulse at 115 beats/min. Nuchal rigidity was present on physical examination. Due to suspected meningitis, the patient was promptly started empirically on intravenous dexamethasone, acyclovir, ceftriaxone, vancomycin, and ampicillin. Non-contrast computed tomography of the brain revealed no acute abnormalities. A lumbar puncture was performed after the initiation of antibiotics in the ER with an opening pressure of 19 cm and cloudy appearing cerebrospinal fluid. CSF analysis revealed WBC of 2640/cumm with 94 % neutrophils, 3 % lymphocytes, 3 % monocytes, protein of 507.8 mg/dL, and glucose of 22 mg/dL, consistent with bacterial meningitis. CSF culture was negative for any growth. Two blood cultures obtained at the time of admission were positive for *streptococcus gallolyticus*. Transthoracic echocardiogram was negative for any vegetations. The patient was informed of the strong correlation of *S. gallolyticus* infection and possible underlying colorectal malignancy however the patient refused colonoscopy given his advanced age and comorbidities. He was treated successfully with 14-day course of IV ceftriaxone.

DISCUSSION: The *Streptococcus bovis* group non-enterococcal group D streptococcus includes *S. gallolyticus*, *S. infantarius*, *S. macedonicus*, and *S. pasteurianus*. All are found in the human gastrointestinal tract. These pathogens are associated with colorectal carcinogenesis and endocarditis. It is believed that these pathogens spread hematogenously via underlying ulcerations of neoplastic colorectal lesions. There are numerous case reports describing the relationship between *S. gallolyticus* and colorectal carcinoma, and questions remain surrounding whether the presence of the bacteria could facilitate carcinogenesis. Ruoff et al. 2007 and Corredoira et al. 2008 report associations between patients with *S. bovis* infections who underwent colonoscopy and were found to have increased incidence of colorectal adenocarcinoma as well as tubular adenomas, confirming the notion that *S. bovis* infections can be associated with premalignant colonic lesions. Abdulmir et al. 2011 elucidate possible mechanisms in which *S. gallolyticus* participates in the carcinogenesis of colorectal mucosal tissues by increased tumor tissue-selective adhesion, induction of inflammatory mediators, selective colonization of tumor cells, and subsequent local disruption of tumor tissues and capillaries aiding in its hematogenous spread. Biarc et al. 2004 reported that *S. bovis* releases proteins that stimulate inflammation and has been associated with COX-2 over expression, suggesting that the pro-inflammatory potential of *S. bovis* can play a role in colon carcinogenesis. The association between *S. bovis* infections and colon cancer should not be underestimated and full bowel examination is highly recommended especially when it concerns *S. gallolyticus* bacteremia. Further studies are needed to elucidate the pathogenesis, possible pro-carcinogenic properties, and detection of the *S. bovis* group.

A CASE OF A RENAL “CODE STEMI” Priscilla Givens²; Jasna Ikanovic²; Thomas Montgomery¹. ¹Carolinas Healthcare System, Charlotte, NC; ²Carolinas Medical Center, Charlotte, NC. (Tracking ID #2199272)

LEARNING OBJECTIVE #1: Management of acute presentation of renal artery stenosis

CASE: A 53 year old man with past medical history of obstructive sleep apnea presented to the hospital after he was found to have systolic pressures over 200 mmHg and hypoxemia to oxygen saturation (O2 sat) of 90 % at a local clinic where he sought to address orthopnea and paroxysmal nocturnal dyspnea that began three days prior. Chest x-ray showed diffuse pulmonary edema prompting administration of nitroglycerin and diuretics. Initial evaluation showed a beta natriuretic peptide of 851 pg/mL (ULN 100 pg/mL), a troponin of 0.02 ng/mL, and a cardiac ejection fraction of 18 %. Blood pressure control was regained over the course of the day, but symptoms recurred overnight. Given the above findings, the leading diagnosis was flash pulmonary edema secondary to congestive heart failure as a result of hypertensive emergency. The patient, a very reliable historian, denied a history of hypertension. Well-controlled sleep apnea, benign thyroid studies, and negative urine drug screen narrowed the differential diagnosis further. Renal ultrasound showed occlusion of L renal artery that was later confirmed on left heart catheterization showing a 99 % occlusion. The episodic flash pulmonary edema recurred over the following 48 h prompting renal artery dilation and stenting that resulted in 100 % patency and complete resolution of symptoms.

DISCUSSION: Renal artery stenosis (RAS) is categorized as non-atherosclerotic or atherosclerotic. Non-atherosclerotic RAS, such as fibromuscular dysplasia, accounts for less than 10 % of RAS.¹ Atherosclerotic RAS, accounting for 90 %, is more prevalent amongst the older population with multiple cardiovascular risk factors.² Management of RAS has remained predominantly medical, focusing on renin-angiotensin-aldosterone axis modulation, with other acceptable approaches including calcium channel or beta receptor blockade. The remainder focuses on atherosclerosis prevention with lifestyle changes, aspirin, and statins.³ Treatment strategies are based on randomized prospective clinical trials including Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL), Angioplasty and Stenting for Renal Artery Lesions (ASTRAL), and the Stent Placement and Blood Pressure and Lipid-Lowering for the Prevention of Progression of Renal Dysfunction Caused by Atherosclerotic Ostial Stenosis of the Renal Artery (STAR). CORAL showed that medical treatment has no mortality benefit. ASTRAL and STAR trials support medical therapy, showing higher risk-to-benefit ratio from stenting versus medical therapy, and a meta-analysis by Riaz et al. echoed previous findings showing no advantage of endovascular stenting compared to medical treatment alone.⁴ The reason for sparse randomized data to support revascularization for atherosclerotic RAS is the lack of a subgroup of acutely-presenting patients in the large randomized studies such as CORAL, ASTRAL, and STAR. Navaravong details a case of acute renal artery occlusion presenting with acute worsening heart failure, concluding that this subset of patients should be considered for revascularization, likening its role to that in myocardial infarction caused by plaque rupture.⁵ Percutaneous transluminal renal angioplasty (PTRA), which initially won favor as the less invasive option than surgery, has been a debated modality of treatment of acute RAS but has less evidence for resolution of persistent hypertension or renal function.⁶ Small prospective trials, however, support its reduction of mortality compared to medical therapy alone in the acutely presenting patient.³ Whichever mode was employed, however, flash pulmonary edema appears to be the factor consistently supportive of revascularization.⁷ We present a case of renal artery occlusion from an acute plaque rupture in a previously normotensive patient, who presented with resistant hypertension resulting in myocardial stunning with flash pulmonary edema. This presentation placed our patient in the subset that may benefit from stenting and we elected to proceed. After the stent was placed, the patient's blood pressure normalized with no recurrence of flash pulmonary edema. He did not require antihypertensives at discharge. Though medical therapy remains the standard of care in clinically stable patients, the acute unstable presentation, such as flash pulmonary edema, can cause increased mortality if endovascular stenting is deferred. The patient presented in this case was an ideal candidate given his critical presentation with renal artery plaque rupture and occlusion, just as the endovascular stenting is a life saving measure for the acute myocardial infarction. In clinically stable patients, medical therapy is superior to endovascular stenting, but in presentations of plaque rupture resulting in acute renal artery stenosis with resulting flash pulmonary edema, endovascular stenting can decrease mortality

A CASE OF ACTIVE PULMONARY TUBERCULOSIS ASSOCIATED FIBROSING MEDIASTITIS John L. Vo; Nader Kamanger. Olive View-UCLA Medical Center, Studio City, CA. (Tracking ID #2195274)

LEARNING OBJECTIVE #1: Recognize the clinical and radiographic manifestations of fibrosing mediastinitis

LEARNING OBJECTIVE #2: Understand the pathophysiology of fibrosing mediastinitis

CASE: We report a case of a patient with fibrosing mediastinitis associated with active pulmonary tuberculosis. The patient is an 80 year old Iranian female with chronic obstructive pulmonary disease who presented with subacute on chronic dyspnea on exertion. Her radiographic studies disclosed chronic pulmonary embolic disease, broncho-mediastinal fistula, narrowing of the right main stem bronchi and superior vena cava, extensive mediastinal and hilar calcifications consistent with FM. Subsequent bronchoscopy yielded sputum positive for acid fast bacilli, eventually cultured as mycobacterium tuberculosis complex. She was subsequently started on RIPE therapy (rifampin, isoniazid, pyridoxine, and ethambutol). How this intervention will halt progression of FM remains to be seen. Treatment of FM is particularly challenging as no studies have shown substantial efficacy in combating evolution of disease. Treatment is primarily palliative with efforts concentrating on ameliorating the resultant vascular or airway obstruction through surgical means.

DISCUSSION: Fibrosing mediastinitis (FM) is a pathological process characterized by an inappropriate and excessive fibrotic reaction in the mediastinum. The resultant expansion within the restricted space results in variable compromise of airways, central systemic veins, the esophagus, and pulmonary arteries or veins which subserves as the pathologic basis of clinical manifestation. The cause is unknown in the majority of cases but several associations have been delineated as possible impetuses. The most common in the United States is prior history of Histoplasma capsulatum. Other rare infectious associations

include tuberculosis, aspergillosis, mucormycosis, blastomycosis, coccidioidomycosis, and cryptococcus. Non-infectious associations include Behcet's disease, radiation therapy, sarcoidosis, and idiopathic fibrotic diseases. Given the lack of a salient cause and effect relationship, a genetic predisposition to the pathologic fibrotic reaction has been theorized. It has been postulated that the relative risk of FM is three times higher in individuals with the HLA (human leukocyte antigen)-A2 antigen suggesting host specific factors contributing to progression of malady. Several propositions have been presented to explain the underlying mechanism and the natural history of FM. In general, it is thought to be an abnormal host response to an infectious or inflammatory challenge that involves the mediastinal lymph nodes. It has been theorized that FM is a spectrum of disease with less severe disease representing mediastinal granulomas, which are often benign. Many believe this is a precursor lesion to more diffuse FM. It is hypothesized that the rupture of mediastinal granulomas into the mediastinal space precipitates progression to FM. Symptoms are often variable and nonspecific but when present often reflect compression of structures within the mediastinum. Based on a retrospective study evaluating 71 cases of FM, it was found that 41 % had cough, 23 % had chest pain, 31 % had dyspnea, and 31 % had hemoptysis. Airway obstruction is a frequent sequela which reflects clinically as dyspnea and can potentially lead to post obstructive pneumonia. Superior vena cava (SVC) syndrome is also often a sequela of obstruction of the SVC from thrombosis or external compression. The right paratracheal nodes are often responsible for compressing the SVC, leading to distension of the face, neck and arms and engorgement of the veins distal to the SVC. The diagnostic study of choice for FM is high resolution computed tomography of the chest. CT radiographs display either a focal or more diffuse pattern of involvement. The focal form often displays a localized, calcified mass in the paratracheal or subcarinal region. The diffuse type displays more involvement of the whole mediastinum, often obliterating normal mediastinal fat planes and encases or invades adjacent structures. Often there is discrete calcified paratracheal, hilar, and subcarinal lymphadenopathy. FM is a radiographic diagnosis; the need for more invasive diagnostic measures, such as mediastinoscopy or thoracotomy, are often unnecessary. No data exists to substantiate the efficacy of any treatment modality for FM. Corticosteroids, antifungals, and estrogen receptor modulators have been used with limited results. Often treatment lies in ameliorating the obstructive effects of the mass with surgery being the mainstay. SVC bypass with spiral vein graft and endovascular interventions such as stenting or balloon angioplasty are often modalities pursued to mitigate the vascular manifestations of FM. Resection of stenotic airway and/or distal lung parenchyma or bronchoscopically placed airway stents are used to alleviate the airway manifestations of FM.

A CASE OF CERVICAL MANIPULATION CAUSING STROKE & EXPLORING ITS BIOMECHANICS. Larry J. McMann¹; Rudin Gjeka¹; Reem Al-Mahdawi¹; Hussam Sabbagh¹; Dustin Reynolds²; Firas Ido²; Sarwan Kumar¹; Zain Kulairi¹; Maliha Naseer¹. ¹Wayne State University, Rochester, MI; ²American University of the Caribbean, Coral Gables, FL. (Tracking ID #2181779)

LEARNING OBJECTIVE #1: Recognize characteristic clinical scenario for vertebral artery dissection after cervical manipulation.

LEARNING OBJECTIVE #2: Judicious prescribing habits for cervical manipulation.

CASE: A 43-year-old female presents to the emergency room with left sided upper and lower extremity weakness after cervical manipulation. She had been having occipital headaches and neck discomfort over the preceding 3 days. On the morning of admission she visited a chiropractor where they performed cervical manipulation. Later that afternoon, while driving her vehicle she developed vertigo. She then attempted to ambulate to her front door when she got profoundly weak and paralyzed on her left side. In the Emergency Department her blood pressure was 227/139, remainder of her vital signs were within normal limits. On Physical exam she had hemiparesis on the left side of her body. Given her focal neurological deficits a stroke was suspected, Computed Topography (CT) of the brain without contrast was ordered and was unremarkable. Tissue plasminogen activator was administered in the emergency room. CT angiography was later performed to localize the lesion and it demonstrated a vertebral artery dissection on the right side. It was decided that the patient would benefit from endovascular intervention and was transferred to an institution in the local area for the procedure.

DISCUSSION: Manipulation of the cervical spine has been considered an effective treatment modality by alternative healers, predominately chiropractors. The risk of having trauma to the vertebral-basilar system resulting in a stroke is of major concern. The internist should always be vigilant of possible vertebral artery dissection in a young patient presenting with vertigo or weakness after cervical manipulation. Since this is a rare entity and many practitioners are unaware of this complication, there can be oversight in obtaining a proper history of cervical manipulation. Arterial dissection due to cervical manipulation is rare. Studies suggest that 1 in 2,000,000 cervical manipulations results in a dissection in the vertebral-basilar system.

A CASE OF CRYOGLOBULINEMIC VASCULITIS SECONDARY TO HEPATITIS C VIRUS (HCV) Mahjabeen Haq¹; Alexandra Perel-Winkler³; Nazia Hussain². ¹Mount Sinai St Luke's-Mount Sinai Roosevelt, New York, NY; ²Mount Sinai St Luke's-Roosevelt Hospital, New York, NY; ³Mt. Sinai St. Luke's-Roosevelt, New York, NY. (Tracking ID #2199013)

LEARNING OBJECTIVE #1: Recognize clinical features of Cryoglobulinemic Vasculitis

CASE: Fifty-eight year old female with history of Hepatitis C virus (HCV), anemia, and chronic diastolic heart failure, recently emigrated from Egypt, presented to the emergency department complaining of 1 year of intermittent pleuritic chest pain and progressive rash on her extremities. Review of systems revealed arthralgias in her knees and elbows and forty pound weight loss over the past year as well. In the ER, she was hemodynamically stable and in no acute distress. Physical exam was significant for decreased breath sounds at bilateral bases and a purpuric rash in upper extremities. Initial laboratory abnormalities included elevated creatinine of 2.0 and hemoglobin of 7.9. A CT chest showed a loculated right pleural effusion causing a compressive atelectasis. A thoracentesis revealed exudative fluid with elevated white blood cells. Rheumatology, dermatology, and nephrology were consulted. The rheumatologic workup was significant for a positive Rheumatoid Factor of 1510 and low complement C3 level at 63. Skin biopsy of the purpuric rash showed a leukocytoclastic vasculitis. Kidney function continued to decline. Urinalysis showed microscopic hematuria but urine sediment did not show dysmorphic RBC or casts. Renal biopsy showed diffuse endocapillary proliferative glomerulonephritis with membranoproliferative features and immune complexes. The immunofluorescence findings of granular global glomerular capillary wall and meningeal staining for IgM, kappa, and C3, with weaker staining for IgG and lambda, supported the diagnosis of immune complex-mediated glomerulonephritis and were suggestive of cryoglobulinemic glomerulonephritis. Pleural biopsy for recurrent pleural effusions revealed chronic lymphoplasmacytic inflammation. Patient's hospital course was complicated by pulmonary edema. Given the clinical picture with renal biopsy results, the patient was diagnosed with cryoglobulinemic glomerulonephritis secondary to Hepatitis C virus. Patient was treated with Prednisone at 60 mg daily and has received her first dose IV Cytoxan 1000 mg with plan to treat Hepatitis C virus. There has been stabilization of renal function and improvement in joint pain and rash.

DISCUSSION: Cryoglobulins consist of immunoglobulins and complement components that precipitate in cold and dissolve upon rewarming. There are three types of cryoglobulins. Type II, Essential Mixed Cryoglobulinemia, is associated with HCV. It is characterized as mixed polyclonal Ig with monoclonal Ig that has rheumatoid factor activity. In HCV, cryoglobulins contain anti HCV antibodies, HCV RNA and IgM Rheumatoid factor. Cryoglobulinemic vasculitis is an inflammatory syndrome involving small to medium sized vessel vasculitis with cryoglobulin immune mediated complexes. Typically, patients present with purpuric rashes and glomerulonephritis along with renal insufficiency. Less commonly, pulmonary and cardiovascular symptoms have been described. Renal injury includes microscopic hematuria and proteinuria and severe hypertension. Kidney biopsies have shown several histological pathologies including membranoproliferative glomerulonephritis, subendothelial deposits, and intraluminal thrombi of cryoglobulins. Lung involvement is an uncommon manifestation of cryoglobulinemic vasculitis. There are cases of respiratory failure, ARDS, and hemoptysis with mixed cryoglobulinemia. Also high levels of cryoglobulins and immune complexes increase blood viscosity and blood pressure causing pulmonary edema. Our patient is a case where there was significant pulmonary involvement.

A CASE OF EBV-ASSOCIATED HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS Chelsea E. Pearson, Barnes-Jewish Hospital, St Louis, MO. (Tracking ID #2198719)

LEARNING OBJECTIVE #1: Recognize Lymphoproliferative Complications of EBV infection

LEARNING OBJECTIVE #2: Diagnose and manage EBV-related HLH

CASE: EE was a 22 year old Caucasian male with no past medical history who presented with low-grade fevers, chills, and drenching night sweats that had been progressively worsening over the prior 3 weeks. These symptoms were accompanied by daily headaches without phono- or photophobia or neck stiffness. He also endorsed poor appetite with a 15 lb total weight loss, malaise, and generalized weakness. He denied abdominal pain or distension, nausea, changes in stool, skin changes, cough, infectious symptoms, or easy bruising or bleeding. At that time he was not taking any medications and he was not aware of any allergies. Family history was noncontributory. He was a student at a nearby community college and rarely drank alcohol; no tobacco or drug use. He was not sexually active. Immunizations were up to date. On examination, the patient was a pleasant, well-developed young male in no distress. Physical exam was unremarkable except for

conjunctival pallor and spleen tip palpable 4–5 cm below the costal margin. Vital signs were all within normal limits and the patient had a BMI of 25.5 kg/m². Complete blood count was significant for total white blood cell count of 1.2 k/mm³ (ANC 0.6 k/mm³), hemoglobin 10.8 g/dL, and platelets of 55 k/mm³. Basic metabolic panel was normal. Hepatic function panel revealed total protein 5.9 g/dL, albumin 3.2 g/dL, total bilirubin 0.6 mg/dL, alkaline phosphatase 533 u/L, aspartate transaminase 583 u/L, alanine transaminase 608 u/L. INR was 1.2. Given his B-type symptoms and pancytopenia, PET was obtained and revealed splenomegaly as well as diffuse abdominal lymphadenopathy. Bone marrow biopsy was negative for lymphoma, although flow cytometry showed a small abnormal population of CD16-NK cells. Liver biopsy revealed erythrophagocytosis and severe hepatitis with necrosis and was EBV positive. Peripheral blood EBV PCR was also greater than 437858 copies/ml. Based on this, patient was started on acyclovir and discharged with the diagnosis of chronic active EBV infection. However, he continued to have severe night sweats, fevers, and chills so he was readmitted about 5 days later. Further laboratory studies were obtained and revealed elevated ferritin and triglycerides (at 795 and 453, respectively) and low fibrinogen at 123. He also had a tonsillar biopsy that showed benign lymphoid tissue. As lymphoma was ruled out, the patient was found to meet criteria for EBV-associated Hemophagocytic Lymphohistiocytosis (HLH) and was transferred to the oncology service for initiation of chemotherapy. EE was treated per the HLH-94 protocol, and received a regimen of dexamethasone, etoposide, and rituximab. He continued on acyclovir. Clinical markers including transaminases, ferritin, blood counts, and EBV viral load improved and the patient reported resolution of his B-type symptoms.

DISCUSSION: EBV infection usually manifests with infectious mononucleosis (IM), typically following a self-limited course and not requiring specific therapy. However, EBV uncommonly presents fulminant manifestations, such as fever, severe hepatosplenomegaly, cytopenias, coagulopathy, CNS abnormalities, and vascular dysfunction. EBV typically targets B-lymphocytes but can also cause lymphoproliferative disorders affecting T- or NK-cell lymphocytes. The former causes fulminant IM, but the latter can result in a spectrum of diseases including chronic active EBV, EBV+ lymphoma-associated hemophagocytic syndrome, and EBV-associated hemophagocytic lymphohistiocytosis (EBV-HLH). HLH is a disease of uncontrolled immune activation, characterized by proliferation of morphologically benign lymphocytes and macrophages that secrete high amounts of inflammatory cytokines. To meet criteria for EBV-HLH, one must meet five of eight criteria as established by the Histiocyte Society for HLH and have definite evidence of EBV infection (by either viral DNA or mRNA assay). The eight criteria include fever, splenomegaly, cytopenias (affecting at least two of three lineages in the peripheral blood), hypertriglyceridemia and/or hypofibrinogenemia, hemophagocytosis in bone marrow, spleen or lymph nodes, low or absent NK cell activity, ferritin >500 ng/ml, and soluble CD25 (soluble IL-2 receptor) >2400 U/ml. EE was diagnosed with EBV-HLH given that he met six criteria: fevers, splenomegaly, cytopenias, hypertriglyceridemia, ferritin elevation, and hemophagocytosis. Given that the pathogenesis of EBV-HLH is driven by the activation and proliferation of EBV-infected T-cells, treatment usually consists of steroids, cyclosporine A, and etoposide. Fulminant IM is usually treated with rituximab to target infected B-lymphocytes. Allogeneic stem cell transplant is necessary for therapy-resistant or refractory EBV-HLH. Recognizing the spectrum of EBV-related disorders is important as the focus shifts from treating an infectious disease to treating a lymphoproliferative one.

A CASE OF HEADACHE NECK PAIN AND RASH WHAT IS IN YOUR DIFFERENTIAL Jocelyn A. Carter², Kathleen M. Finn¹, ¹MGH, Boston, MA; ²Massachusetts General Hospital, Lebanon, NH. (Tracking ID #2199822)

LEARNING OBJECTIVE #1: Appreciate the overlap and subtle differences expected in lumbar puncture results seen in meningitis caused by infection vs ruptured aneurysm

LEARNING OBJECTIVE #2: Recognize the clinical manifestations, morbidity and mortality associated with a ruptured aneurysm

CASE: A 63 year old gentleman with a history of throat cancer and hypertension was transferred from a community hospital with a diagnosis of meningitis. Ten days prior, the patient awakened with a severe headache, facial rash, periorbital edema and conjunctival injections followed by the development of neck pain and stiffness hours later. He had been doing yard work the day prior and was prescribed steroids for poison ivy. His periorbital swelling and rash resolved but the headache and neck pain persisted. Seven days later he underwent a CT brain (normal) and a lumbar puncture which revealed 256 white blood cells (WBCs) with 56 % neutrophils, 45 % monocytes, 24 red blood cells (RBCs), glucose of 64 mg/dl, and protein of 56 mg/dl. Intravenous vancomycin and ceftriaxone were started and he was transferred to our hospital for further management of meningitis. The patient reported frequent tick bites with an untreated targetoid rash one month prior. He endorsed drinking untreated well water before his illness and had facial zoster 3 years earlier. On transfer, the patient described the headache/neck pain as 10/10 in severity and diffuse. Home medications were MS Contin 100 mg twice daily, lorazepam 1 mg daily,

trazodone 150 mg nightly and hydrochlorothiazide 25 mg daily. On exam he was ill appearing with a heart rate 60 bpm, blood pressure 161/77 mmHg, and positive Jolt, Kernig and Brudzinski signs. A slightly disconjugate gaze was noted and an MRI brain was obtained demonstrating left sylvian fissure enhancement suggestive of meningitis but significant motion artifact. Ampicillin and acyclovir were added and a CT brain was ordered. On hospital day 2, the patient felt improved with no headache/neck pain. The CT demonstrated left middle cerebral artery signal enhancement consistent with ruptured aneurysm. All infectious serologies/cultures returned negative.

DISCUSSION: Over 6 million people in the United States have cerebral aneurysms and rupture occurs in 30,000 individuals yearly. Cerebral aneurysm rupture has a high mortality and morbidity requiring timely assessment and management. Both aneurysm rupture and infectious meningitis can present with headache, altered mental status and signs of meningeal irritation. While large numbers of CSF RBCs and xanthochromia point to aneurysmal rupture (unless it is a traumatic tap), xanthochromia can dissipate after 1–2 weeks as RBCs breakdown. Irritation caused by the blood products and an invasion of WBCs into the CSF may result in concurrent meningitis. Up to 32 % of ruptured aneurysms are initially missed. The sensitivity of CT in detecting ruptured cerebral aneurysm varies- 98 % at 12 h, 80 % at 72 h, and 50 % at 1 week. As seen in this case, heuristic bias (framing) may delay diagnosis, however intracranial aneurysm rupture should always be on the differential in patients with headache and meningeal signs despite CSF WBC predominance.

A CASE OF LATE-NIGHT PARALYSIS OF THE EXTREMITIES Kenji Yoshida; Tatsuya Fujikawa; Hisanori Morimoto. Mitoyo General Hospital, Kan-onji City, Japan. (Tracking ID #2191653)

LEARNING OBJECTIVE #1: Recognize hypokalemic thyrotoxic periodic paralysis (HTPP) as hyperthyroidism-related hypokalemia and paralysis of the extremities, typically occurring in young Asian males.

LEARNING OBJECTIVE #2: Manage hypokalemia of HTPP to prevent or reduce the symptoms of cardiac arrhythmias, although long-term definitive therapies for hyperthyroidism are indispensable.

CASE: A 33-year-old man who worked as a firefighter presented with late-night paralysis of the extremities. He had been previously healthy, except for occasional paralysis of the extremities. His symptoms always occurred at around midnight every 2 months for 3 years and had always resolved without intervention. On the day of admission, he had eaten dinner with alcohol and fell asleep as usual. Two hours later, he woke up feeling weakness in both his legs. He realized that he could neither stand nor raise his legs. Because his symptoms had not resolved for several hours, he visited our emergency room in a wheelchair. He reported no remarkable past medical history besides paralysis, no medicine consumption, no family history, or no appreciable social history, except occasional alcohol consumption. He felt slight palpitation in the emergency room. On physical examination, his body temperature was 36.8 °C; blood pressure, 139/72 mmHg; and pulse rate, 77 beats/min. Goiter was slightly palpable but not visible with the neck extended. Muscle strength was 4/5 in the biceps and triceps bilaterally and 2/5 in the quadriceps femoris and biceps femoris bilaterally. Deep tendon reflexes were low normal (1+) in the patellar and Achilles tendons bilaterally. Electrocardiography (ECG) revealed ST-segment depressions, T-wave inversions, and U waves, particularly in the mid-precordial leads, V2 and V3. Laboratory results revealed that the serum potassium level was extremely low at 2.2 mEq/L (normal range, 3.5–5.0 mEq/L). Treatment with potassium supplementation was started using intravenous drip injection under close monitoring with an ECG monitor and 12-lead ECG. Four hours after initiation of treatment, the symptoms of paralysis, which were probably derived from hypokalemia, improved. In addition, the ST-segment depressions, T-wave inversions, and U waves disappeared on ECG. A thyroid function test revealed: Thyroid-stimulating hormone (TSH), 0.01 µIU/mL (normal range, 0.35–5.00 µIU/mL); free-T3, 12.4 pg/mL (1.7–3.7 pg/mL); and free-T4, 2.5 ng/dL (0.7–1.5 ng/dL). Ultrasound examination of the thyroid gland revealed an increase in thyroid volume and blood flow, which were compatible with diagnosis of hyperthyroidism. Finally, the TSH receptor antibody level was 8.7 IU/L (0–1.0 IU/L) later; thus, we diagnosed him with hypokalemic thyrotoxic periodic paralysis (HTPP) most likely associated with Basedow's disease. After administering thiamazole and propranolol for hyperthyroidism, the patient has remained euthyroid and has not experienced further episodes of hypokalemic weakness.

DISCUSSION: HTPP is a potentially life-threatening complication of thyrotoxicosis, such as in Basedow's disease, toxic nodular goiter, iodine-induced thyrotoxicosis, and excessive thyroxine use. It is characterized by acute and reversible episodes of muscle weakness and hypokalemia due to a massive intracellular shift of serum potassium. The mechanism is considered as a thyroid hormone increase in the activity of the Na⁺-K⁺-ATPase-dependent K⁺-channel and subsequent increase in catecholamine-mediated intracellular potassium shift. This mechanism may explain the male dominance of HTPP

(20:1) because males produce greater concentrations of catecholamines, resulting in stronger $\text{Na}^+\text{-K}^+\text{-ATPase}$ activity as compared with females. $\text{Na}^+\text{-K}^+\text{-ATPase}$ activity is also augmented by insulin as an effect of high carbohydrate intake. Precipitating factors of HTPP include strenuous physical activity, followed by rest, ingestion of a high carbohydrate food load, and alcohol consumption. On the occasional day, our patient trained strenuously for his job and had a relaxing dinner and alcohol at home. Thus, we can assume that his physical activity and endogenous insulin triggered by carbohydrate intake increased the $\text{Na}^+\text{-K}^+\text{-ATPase}$ pump activity. This phenomenon could cause an inflow of potassium into the cells and reduce the level of serum potassium, thereby explaining the late-night paralysis of his extremities. As treatment, potassium supplementation may improve symptoms. Based on the implication of hyperadrenergic activity in the pathogenesis of HTPP, nonselective β -blocker administration has also been reported as an alternative therapy. However, definitive therapies to control hyperthyroidism, including antithyroid drugs, surgical thyroidectomy, and radioiodine therapy, are indispensable to abolish attacks of HTPP. Because patients of Asian ethnicity are frequently encountered even in the Western world, HTPP should be included in the differential diagnosis of muscle weakness as a symptom.

A CASE OF PARTIAL MUSCLE PHOSPHORYLASE DEFICIENCY UNCOVERED AFTER SEVERE RHABDOMYOLYSIS SECONDARY TO A DRUG INTERACTION BETWEEN AMLODIPINE AND SIMVASTATIN Rekha Kambhampati; Giovanna Olivera; James Prister; Gabriela Ferreira. Rutgers-Robert Wood Johnson Medical School, North Brunswick, NJ. (Tracking ID #2200010)

LEARNING OBJECTIVE #1: Recognize that statins can cause life-threatening rhabdomyolysis in patients who are heterozygous for glycogen storage diseases.

CASE: Muscle phosphorylase deficiency is due to an inborn error of glycogen metabolism. We present a case of severe statin induced rhabdomyolysis secondary to a drug interaction between amlodipine and simvastatin that ultimately uncovered the diagnosis of underlying partial muscle phosphorylase deficiency. The patient was a 60 year old man with a past medical history of hypertension, hyperlipidemia, type 2 diabetes mellitus who was hospitalized 2 weeks prior to admission for non-ST segment elevation MI treated with bare metal stenting to the left circumflex coronary artery. He subsequently presented with fever and oliguria secondary to a urinary tract infection. The patient's initial presentation was notable for a temperature of 100.6 °F, normal muscle mass and strength, white blood cell count of 13, CPK 153, and pyuria on urinalysis. He was started on ceftriaxone for his urinary tract infection and his home medications, including simvastatin 80 mg nightly, were continued. Amlodipine 10 mg daily was added for hypertension control. Two days later, he began complaining of proximal muscle pain and weakness and decreased deep tendon reflexes were observed on physical exam. His CPK rose to 3000 and his simvastatin and amlodipine were discontinued. EMG showed no signs of motor neuropathy. He developed acute kidney injury despite supportive care and his CPK peaked at 420,000 on hospital day 13. He required transfer to the intensive care unit for decreasing vital capacity and respiratory distress, likely secondary to diaphragmatic myopathy. A muscle biopsy was performed and revealed severe myonecrosis, partial deficiency of myophosphorylase and myofiber type 2 atrophy. The patient was started on tapering steroids and his CPK improved rapidly, with slower resolution of his weakness. His acute kidney injury resulted in end-stage renal disease necessitating permanent hemodialysis.

DISCUSSION: A study conducted by Vladutiu, et al. demonstrated that heterozygotes for myophosphorylase deficiency may be at increased risk for myopathic outcomes. The proposed mechanism involves a statin-mediated reduction in already impaired intracellular myophosphorylase activity resulting in severe myopathy. This case highlights several important issues in clinical practice. The increased propensity for rhabdomyolysis when using high-dose simvastatin or during the concomitant administration of simvastatin with amlodipine is well described. Although these safety concerns were amended to the simvastatin label in 2011, recognition of this phenomenon in the medical community has lagged behind. This patient's presentation also underscores the importance of the evaluation for hereditary metabolic diseases in patients presenting with drug-induced myopathies, as the frequency of heterozygotes for glycogen storage diseases is more common than once thought.

A CASE OF PERNICIOUS ANEMIA MASQUERADING AS THROMBOTIC THROMBOCYTOPENIC PURPURA Krishnalatha Devakiamma; Tsering Dhondup; Adarsh Goyal; Puneet Tejsinghani; Raj Ghimire; Jayamohan Nair. Mercy Catholic Medical Center, Drexel Hill, PA. (Tracking ID #2199108)

LEARNING OBJECTIVE #1: Recognize pernicious anemia as a cause of schistocytosis.

LEARNING OBJECTIVE #2: Manage a potentially life threatening, but completely reversible manifestation of B12 deficiency.

CASE: A 67 year old gentleman presented to emergency department with complaints of progressively worsening fatigue for 2 weeks. Neurological examination showed moderate confusion and gait ataxia. His laboratory results revealed anemia with hemoglobin of 3.5, high mean corpuscular volume (108) and thrombocytopenia (platelet count of 66). Peripheral smear showed numerous schistocytes and macroovalocytes. Serum LDH level was high (4875) and serum haptoglobin level was low (<10). Liver function tests showed indirect hyperbilirubinemia and mildly elevated transaminases. Constellation of the findings of anemia, thrombocytopenia, schistocytes, elevated levels of LDH and low levels of haptoglobin in a patient with worsening fatigue and confusion led to the diagnosis of TTP and he was started on plasmapheresis. However the high MCV, macro ovalocytosis in the smear, low reticulocyte count and normal coagulation panel were not fitting entirely with the syndrome of TTP and so serum B12 level was ordered. The platelet counts did not improve significantly with plasmapheresis. The serum B12 levels were low (<30 pg/ml). Patient was treated with intramuscular vitamin B12 injections. Reticulocyte counts immediately showed improving trends. Patient improved both symptomatically and hematologically with continued B12 injections. His anti-intrinsic factor antibodies later came back positive confirming the diagnosis of pernicious anemia.

DISCUSSION: Schistocytes in peripheral smear in appropriate clinical setting may point to micro angiopathic hemolytic anemia. However there are other causes of schistocytes in peripheral smear which may need totally different treatment strategies. B12 deficiency is one of them which can cause a syndrome very similar to thrombotic thrombocytopenic purpura (TTP). Vitamin B12 is required for normal synthesis of DNA and metabolism of homocysteine to methionine. B12 deficiency would lead to ineffective erythropoiesis, maturation arrest of the red blood cell precursors, hemolysis in the bone marrow, decreased erythrocyte deformability and increased red blood cell membrane fragility. As homocysteine can not be converted back to methionine in the absence of Vitamin B 12, the homocysteine levels goes up causing endothelial dysfunction. Endothelial dysfunction in the setting of increased cell fragility, is the presumed reason for schistocyte formation in Vitamin B12 deficiency. The presentation is very similar to TTP and therefore referred to as pseudo TTP. However, these patients will not respond to plasmapheresis and they need Vitamin B12 injections for resolution of clinical findings. High index of suspicion and clinical awareness of the condition is required to spot the correct diagnosis. Although a TTP like clinical syndrome is a well described manifestation of B12 deficiency, many practicing physicians are unaware of the entity. Our case report aims to make clinicians aware of the condition. It is extremely important to spot the diagnosis early as it is a potentially life threatening condition but completely reversible if treated early in the course.

A CASE OF PYODERMA GANGRENUM ORIGINATING IN THE SPLEEN

Tatsuya Fujikawa¹; Kenji Yoshida¹; Takayasu Suzuki². ¹Mitoyo General Hospital, Kan-onji, Japan; ²Osaka Medical College, Takatsuki, Japan. (Tracking ID #2144481)

LEARNING OBJECTIVE #1: Recognize the clinical features of pyoderma gangrenosum, particularly features that occur all over the body, and trauma or surgical scars that may develop into PG.

LEARNING OBJECTIVE #2: Treat pyoderma gangrenosum with systemic steroids and even with immunosuppressive agents.

CASE: A 51-year-old woman with type 2 diabetes and hyperlipidemia visited our hospital for a regular visit. Her past history included right lower limb amputation for diabetic foot and pyoderma gangrenosum (PG) in her right neck. The patient complained of slight discomfort in the left upper quadrant, and on clinical examination, high-grade fever (38.5 °C), tachycardia, and splenomegaly were noted. Laboratory results revealed leukocytosis (white cell count: 20,100 cells/ μl) and elevated C-reactive protein levels (22.28 mg/dl). Contrast enhanced computed tomography (CT) of the abdomen after plain CT revealed multiple hypodense lesions in the spleen, which were speculated to be splenic abscess. Splenic abscess was initially suspected due to bacterial infection; therefore, broad-spectrum antibiotic therapy was initiated under hospitalization. Two sets of blood cultures tested negative for any bacteria, and procalcitonin was within the normal range. The high-grade fever continued, and clinical symptoms of the left abdominal distension and laboratory data did not improve, in spite of antibiotic therapy. Follow-up CT after a week revealed multiple and rapidly enlarging splenic hypodense lesions, which compressed the stomach, and a further enlarged spleen was observed compared with that observed in the previous week. The patient underwent an open splenectomy due to the risk of splenic rupture. Pathological findings revealed splenic abscess-like nodules containing large amounts of inflammatory cells, mainly neutrophils, but without specific inflammation. Splenic pus cultures tested negative for any bacteria. At this point, the patient was diagnosed with PG originating in the spleen. After splenectomy, her condition improved once prednisolone was administered and she was discharged from the hospital. However, in the process of tapering the dose of prednisolone, intra-abdominal abscess and skin abscess on the old scar after a central venous catheter on the neck were observed, and

exacerbation of PG was assumed. Then, after addition of cyclosporin A with prednisolone, intra-abdominal abscess or skin abscess were improved. Although prednisolone is currently being tapered off, no abscesses have been observed.

DISCUSSION: PG is a rare, non-infectious, ulcerative skin disorder, occurring mainly in females. Approximately 50 % of cases are associated with systemic diseases, such as inflammatory bowel disease, arthritis, and leukemia. The clinical condition is thought to be an immune system disorder with non-specific extensive neutrophil inflammation of the skin with vasculitis-like features. Diagnosis is made by clinical presentation and failure to improve after conservative or antibiotic treatment, which is diagnosed by exclusion, and is therefore often delayed. Although PG often develops on the skin at sites of trauma, such as biopsy and surgical scars, it may occur all over the body. Splenic PG, as in this case, is rarely reported in the literature. With regard to splenectomy in the present case, surgical scars did not develop into PG, owing to the prophylactic administration of systemic steroids to prevent PG. The first choice of treatment for PG generally is systemic steroids combined with conservative wound care. However, additional immunosuppressive agents such as cyclosporine and azathioprine may be necessary.

A CASE OF QUESTIONABLE MEDICAL CAPACITY AND IMMUTABLE INDIVIDUAL AUTONOMY Kathryn M. Lohmann; Jeffrey Talbot. Emory University, Kennesaw, GA. (Tracking ID #2199906)

LEARNING OBJECTIVE #1: Assessing medical capacity and distributive justice

CASE: A 51 year old female with a history of acquired immunodeficiency syndrome, End Stage Renal Disease on hemodialysis, Chronic Obstructive Pulmonary Disease, diastolic heart failure with reduced ejection fraction, and poly-substance abuse presented in severe sepsis with volume overload and respiratory failure secondary to inconsistency attending HD and taking her medications. Over the course of the last year, the patient had a longstanding history of medical non-compliance with multiple admissions to the primary city hospital and also the midtown hospital. One week previously, after treatment for renal failure and pneumonia, the patient elected to elope from the city hospital. During that admission she initially requested and then refused dialysis as well as forcibly removing her access (Permacath). She also refused administration of antibiotics for multi drug resistant *S. aureus* pneumonia. Psychiatry and Ethics were consulted. The patient was deemed to be without capacity for medical decision making. Subsequently, her family decided to withdraw care and transfer the patient to hospice. Before transportation to hospice could be arranged she left her room without warning and could not be located. On her return admission, she rapidly developed respiratory failure and was intubated. After transfer to the MICU and chart review, the above information was revealed. The patient was discharged to hospice for terminal care.

DISCUSSION: This case emphasizes several critically important aspects of medical ethics: the appropriate evaluation of medical capacity, individual autonomy, and distributive justice. The complexity of her medical course is founded upon the question of the patient's decision-making capacity versus her individual autonomy at a basic level. After she had been admitted for similar presentations on multiple occasions (volume overload, pneumonia, bacteremia and electrolyte abnormalities), it was noted repeatedly that she would initiate her medical stay by requesting full treatment and then eventually would decline all interventions, stating that she wanted to die. The patient would then leave only to return in rapidly declining health each time. Though psychiatry was involved and corroborated the lack of medical capacity evaluation, they did not feel it was thorough enough to give her any diagnosis except "mild cognitive impairment". Her sister, the patient's power of attorney, determined that given the patient's ongoing substance abuse as well non-compliance with medical therapies and the advanced nature of her multiple comorbidities, hospice with comfort care would be the most reasonable option. However, this would require the patient's complicit behavior, which was discussed with her at length. Before this measure could be implemented, the patient eloped - expressing a clear desire to live despite non-adherence to medical treatment. Though this decision was made with the patient's best interest in mind, it was in direct opposition to the patient's own judgment, an illustration of the power of individual autonomy. Regarding distributive justice, in the interim prior to the admission referred to in this case, the patient presented to the midtown hospital with respiratory distress and was treated accordingly, including a brief MICU stay. She was discharged home only to re-present 6 days later in respiratory failure at the primary city hospital. There was no communication between the two facilities. A resolution had already been reached at the city hospital regarding her care. Given that the patient regularly refused and left treatment, multiple admissions at differing hospitals with very similar treatment courses argues for a significant waste of precious resources in a resource-scarce area with a heavy population burden. Of course, this did not affect her care as she was treated accordingly on each presentation. Such a situation evinces the disconcerting point of futility of care - care beyond the bounds of what is reasonable when given the ultimate outcome. Resources dedicated to one that may have benefited the many if allocated differently. Beyond the startling realities and moral conflict that such a patient inspires, her medical course required a significant amount of integration

of care. Every level of provider affected her care, including LPNs, RNs, social workers, intensivists, residents and attendings. Our strength and ability to provide the highest quality of compassionate care resulted from our collaboration. First among our collective ethical principles: Do No Harm.

A CASE OF STAPHYLOCOCCUS AUREUS BACTEREMIA COMPLICATED BY LEUKOCYTOCLASTIC VASCULITIS Christina A. Mosher; Joshua L. Owen; Blake R. Barker. UT Southwestern Medical Center at Dallas, Dallas, TX. (Tracking ID #2188729)

LEARNING OBJECTIVE #1: Recognize LCV as a possible presentation of methicillin-sensitive *Staphylococcus aureus* (MSSA) bacteremia.

CASE: A 34-year-old Hispanic man with a history of alcoholic cirrhosis and type two diabetes mellitus presented with 2 weeks of diarrhea, nausea, vomiting, abdominal pain, rash, and syncope. Five days prior to presentation, he developed an erythematous petechial rash on his right hand that spread sequentially to his left hand, forearms, feet, legs and flanks. The rash was not pruritic or painful. He reported no prior history of a similar rash. On admission, he was afebrile, hypotensive (82/69), and tachycardic (104), which resolved after normal saline boluses. Physical exam was significant for petechiae on the hard palate and diffuse palpable petechiae in the distribution described above. His exam was otherwise notable for right elbow erythema and purulent drainage. His serologies were negative for HIV, hepatitis B and C, and rheumatoid factor, and he had a low serum complement component 3 (C3) of 56, low-normal complement component 4 (C4) of 10, positive perinuclear anti-neutrophil cytoplasmic antibodies (p-ANCA), and equivocal proteinase 3 (PR3). A punch skin biopsy of the rash showed an infiltrate of lymphocytes, histiocytes, neutrophils, and eosinophils with minimal fibrin deposition in blood vessel walls. Direct immunofluorescence was positive for immunoglobulin G (IgG) and C3 deposition with trace IgA in the walls of papillary dermal vessels. These findings were consistent with early leukocytoclastic vasculitis (LCV). Two of four admission blood cultures and an elbow wound culture were positive for MSSA. Echocardiogram was negative for vegetations. He was treated for 2 weeks with a third-generation cephalosporin, and his renal function and rash slowly improved.

DISCUSSION: LCV is a small vessel hypersensitivity vasculitis commonly caused by antibiotics (e.g., penicillins, cephalosporins, and macrolides), but it can also arise secondary to connective tissue disease, infections and certain malignancies as a paraneoplastic syndrome.^{1,2,3} This LCV case demonstrates how MSSA bacteremia presents in clinically diverse ways, including as vasculitis. LCV has been described in the setting of MSSA bacteremia previously, but the LCV was attributed to indomethacin.⁴ Additionally, LCV has complicated *Klebsiella* bacteremia; however, it is more often associated with chronic or subacute species such as *Yersinia enterocolitica*, *Mycoplasma pneumoniae*, and *Mycobacterium tuberculosis*, or subacute disease such as cystic fibrosis or endocarditis.⁵ Clinical suspicion for bacteremia should be raised if the rash is asymptomatic, which is uncharacteristic for LCV. If LCV is diagnosed, identify and stop or treat the offending factor, elevate the legs, and use compression stockings.⁶ If the rash persists, colchicine and dapsone are first-line medical therapy.⁶ Hemorrhagic and/or necrotic lesions require corticosteroids.⁷ If the vasculitis is refractory to treatment, plasmapheresis and intravenous immunoglobulin have been successful.⁶ 1. Martinez-Taboada, VM et al. Clinical features and outcome of 95 patients with hypersensitivity vasculitis. *The American Journal of Medicine*. 1997;102:186–191. 2. Mwirigi et al. Hypersensitivity vasculitis with leukocytoclastic vasculitis associated with alpha-1-proteinase inhibitor. *Case Reports in Medicine*. 2009;1–6. 3. Solans-Laqué, R et al. Paraneoplastic vasculitis in patients with solid tumors: report of 15 cases. *The Journal of Rheumatology*. 2008;35:294–304. 4. Hussain, et al. Indomethacin-related leukocytoclastic vasculitis: A Case Report and Review of Literature. *Case Reports in Dermatology* 2013;5:33–37. 5. Lum, P. et al. Leukocytoclastic vasculitis complicating *Klebsiella pneumoniae* bacteremia. *Diagnostic Microbiology and Infectious Disease*. 2000;37:275–277. 6. Chen KR et al. Clinical approach to cutaneous vasculitis. *American Journal of Clinical Dermatology*. 2008;9(2):71–92. 7. Hautarzt et al. Therapy of vasculitides and vasculopathies. 2008 May;59(5):382–93.

A CASE REPORT OF CHRONIC RIGHT HEART FAILURE WITH NORMAL LEFT VENTRICULAR FUNCTION AFTER AN ACUTE RIGHT VENTRICULAR INFARCTION Benjamin Koo; James Tauras. Montefiore Medical Center, Bronx, NY. (Tracking ID #2180701)

LEARNING OBJECTIVE #1: Diagnose and manage acute right ventricular infarction

LEARNING OBJECTIVE #2: Treatment of isolated right sided heart failure after right ventricular infarction

CASE: Patient is a 70 year-old woman with end stage renal disease on hemodialysis, hypertension, diabetes and hyperlipidemia. She presented with sub-sternal, "burning"

chest pain associated with diaphoresis and shortness of breath for one day. Physical examination showed elevated JVP but normal heart and lung exams and no peripheral edema. Electrocardiogram showed normal sinus rhythm, inferior lead q-waves, right bundle branch block without ST changes. She was found to have elevated troponin-t which peaked at 2.46 (normal <0.11) and was treated with aspirin, clopidogrel, heparin and beta blocker. Echocardiogram showed new severe right ventricle (RV) dilation and hypokinesis, severe tricuspid regurgitation with preserved left ventricle function and ejection fraction of 75 %. Lung ventilation/perfusion scan was negative for pulmonary embolism. Left heart catheterization revealed 100 % occlusion of proximal right coronary artery with left to right collaterals and diffuse disease in the left coronary system. Right heart catheterization revealed elevated right sided pressures with a normal pulmonary capillary wedge pressure. Cardiothoracic surgery deemed the patient a poor surgical candidate for coronary artery bypass grafting and tricuspid valve repair due to her severe RV dysfunction. Percutaneous revascularization of the LAD was not pursued due to a lack of angina symptoms and its technical difficulty. Repeat echocardiogram 2 weeks after her initial presentation showed persistence of severe right ventricular failure.

DISCUSSION: We present a unique case of chronic right heart failure with normal left ventricular function after an acute right ventricular infarction. A repeat echocardiogram performed even one year later revealed persistent RV failure with some modest improvement in tricuspid regurgitation. Right ventricular infarction (RVI) is predominantly a complication of inferior myocardial infarctions.^{1,2,8} Its occurrence is reported as approximately 20–50 % of patients suffering from inferior wall MI and most often will involve the right coronary artery.^{2,3,8} Initially those with RVI are at risk for cardiogenic shock, bradycardia and high grade AV block that increases in-hospital mortality. Yet those who survive the acute infarction period have a good prognosis and excellent recovery of RV function whether or not they are revascularized.^{1–4} This suggests that the RV is particularly resistant to infarction and some authors have even described RV “infarction” as a misnomer, as in most patients with RVI have predominantly viable myocardium.^{3,7} Chronic unilateral right heart dysfunction after right ventricular infarction, as witnessed in our patient, is rare.^{3,7,13,15} The difference in anatomy and physiology between the RV and LV allows the RV to be much more resistant to ischemia and necrosis. These differences include 1) lower RV myocardium oxygen demand due to its smaller muscle mass and work load 2) greater perfusion of RV throughout systole and diastole and 3) greater diffusion of oxygen through the thinner wall of the RV.^{2–4,8} These theories help to explain how patients with chronic RCA occlusions can still have the preserved RV function.^{3,8,13} When significant RV infarctions do occur, they most often are due to proximal occlusions of the RCA, proximal to the marginal branches which supply the anterolateral wall of the RV. It is possible that our patient’s concomitant left coronary vessel disease increased her risk for RVI by disrupting left to right collateral circulation.^{2,4,8} Due to the lack of literature, our patient’s long term clinical prognosis is not well known. RV dysfunction in the setting of left heart failure is known to be an independent predictor of mortality, but its significance in the setting of normal LV function is less well known.^{6,9,10,14} Several studies have shown exercise tolerance as a major prognostic tool in chronic right heart failure.^{1,5,10} The evidence that guides the management of isolated RV failure is not nearly as well established as the evidence behind LV failure. General guidelines include optimization of RV preload, fluid and salt restriction and graded physical activity. The standard therapies for LV systolic function (eg. beta blockers, ace inhibitors, mineralocorticoid receptor antagonists) are not validated in isolated RV dysfunction.^{7,10,11} Our patient was treated with beta blockers and spironolactone for neuro-hormonal blockade and her volume status was managed with dialysis. An ace inhibitor was unable to be initiated due to hypotension. Though her RV function one year later on echocardiogram remained unchanged, she did show improvement in her exercise tolerance and overall functional capacity.

A COMMON DIAGNOSIS AFTER AN UNCOMMON ILLNESS IN A COMMON PATIENT Meena N. Hasan; Omar Al Dhaybi. George Washington University, Rockville, MD. (Tracking ID #2159694)

LEARNING OBJECTIVE #1: Recognize cirrhosis as an immunodeficient state.

LEARNING OBJECTIVE #2: Identify acute stroke as a possible side effect of treatment of Cryptococcal meningitis.

CASE: A 52-year-old African American male with a history of cirrhosis and alcohol dependence was admitted after a generalized tonic-clonic seizure, believed to be due to alcohol withdrawal. His last drink was two days prior to presentation. He was on no medications and had no history of neurologic disorders. Other social history and family history was noncontributory. At presentation, his vitals showed tachycardia and his exam indicated a thin appearing male who was tremulous and only oriented to person and place. Neurologic exam was otherwise normal. Labs showed a moderate metabolic acidosis, thrombocytopenia, and elevated PT/PTT/INR. White blood cell count and hemoglobin/hematocrit were normal. His blood alcohol level was slightly elevated, as was his lactate. The patient was admitted. The morning after admission, the patient developed a fever to

39.3 °C. Lumbar puncture (LP) showed an opening pressure of 19 cmH₂O, a white blood cell (WBC) count of 23 mm³ with 88 % lymphocytes, protein 81 mg/dL, and glucose 58 mg/dL. He was diagnosed with presumed viral meningitis. Herpes simplex virus polymerase chain reaction (PCR) was negative in the cerebrospinal fluid (CSF). The patient started to spike daily high-grade fevers in the subsequent week. Human immunodeficiency virus (HIV) serology was negative, and his CD4 count was 867 mm³. Magnetic resonance imaging (MRI) of the brain showed a focal area of enhancement in the right temporal lobe of unclear significance. LP was repeated, showing increased opening pressure (23 cmH₂O), increased WBC count (101 mm³), and a further decreased glucose (28 mg/dL). Further CSF testing was positive for cryptococcal antigen and CSF culture grew *Cryptococcus neoformans*. The patient was treated with amphotericin B and flucytosine. His fevers subsequently resolved and his clinical condition improved. Several days later, he developed acute left sided weakness of the upper and lower extremity. MRI brain showed a new right putamen infarct with multiple small foci of subarachnoid and periventricular enhancement in the cerebellum and throughout the basal ganglia. He was managed supportively, and antifungal therapy was continued. His neurologic deficits subsequently improved, and he was discharged to an acute rehabilitation facility.

DISCUSSION: *Cryptococcus neoformans* is an encapsulated round yeast with narrow based buds. Cryptococcal meningitis usually affects immunodeficient patients, classically with AIDS and a CD4 count under 100 cells/mL. Our patient did not have HIV, but did have cirrhosis, which is also an established risk factor for cryptococcal infections. Cirrhotic patients are believed to be immunodeficient due to elevated endogenous glucocorticoids, complement deficiency, and neutrophil/reticuloendothelial system dysfunction. Central nervous system inflammation with secondary strokes should be anticipated in patients with Cryptococcal meningitis upon initiation of antifungal therapy. A form of immune reconstitution inflammatory syndrome (IRIS) has been reported in patients with Cryptococcal meningitis following initiation of antifungal therapy, typically manifesting as a cerebral infarction in the basal ganglia and thalamus. The underlying pathophysiology is thought to be a reduction in the burden of *Cryptococcus neoformans*, thereby facilitating the reversion of T helper 2 response to a T helper 1 response and a subsequent exuberant host response against residual sites of disease. The use of steroids as therapy in these patients is controversial. Central nervous system inflammation with secondary strokes should be anticipated in patients with Cryptococcal meningitis upon initiation of antifungal therapy. This case highlights the importance of considering cirrhotic patients as immunodeficient when considering work up for infectious etiologies. This case also highlights the link between cryptococcal meningitis and stroke as a known and common phenomenon during treatment.

A COMPARISON OF LABETALOL AND OTHER ANTIHYPERTENSIVES IN TREATMENT OF HYPERTENSIVE ISCHEMIC STROKE Michael J. Damit. Wayne State University, Detroit, MI. (Tracking ID #2198510)

LEARNING OBJECTIVE #1: Manage hypertensive crisis in the setting of cerebrovascular accident with the appropriate IV pharmacological therapy

CASE: Mr. M, a 62 year old African-American male with no past medical history presented with two episodes of falling and complaint of right-sided weakness for 1 day. He had an associated pulsatile ringing in his ears but denied any other symptoms. In the emergency department (ED), he was found to be hypertensive at 233/124. CT scan demonstrated no intracranial hemorrhage, however lacunar infarcts were noted. After some debate regarding how to appropriately manage his blood pressure, labetalol was administered. Initially, a 100 mg IV bolus was given, however blood pressure measurements were not taken in appropriate intervals to measure the therapeutic response. One hour later, the ordering physician unaware of this information, and seeing only the previous measurement, assumed a poor response and a second bolus was ordered. Thirty minutes later the blood pressure had dropped precipitously to 140/104.

DISCUSSION: Hypertensive crisis is defined by a blood pressure ≥180 systolic (SBP) or ≥120 diastolic (DBP) and can be classified into either emergency or urgency. The former describes elevated blood pressures manifesting in acute end organ damage. Urgency, in contrast, is defined as elevated blood pressures in the absence of acute hypertensive complications. Hypertensive crises typically superimpose on existing essential hypertension. In these instances, the marked elevation in blood pressure is often well tolerated owing to chronic pathophysiological changes to persistently elevated blood pressures. However, pressures exceeding the exaggerated autoregulation capabilities lead to endothelial injury, fibrinoid necrosis and failure of the vessel autoregulatory function. To interfere with this process, immediate blood pressure reduction in the form of an IV antihypertensive is indicated. However, abrupt reduction in blood pressure with an overly potent antihypertensive regimen to a relative hypotension can result in worsening ischemia in the context of ischemic stroke. Also, patients with comorbid conditions may not tolerate certain antihypertensives. Therefore, the selection of an agent for gradual reduction in blood pressure should be carefully considered. In practice, the choice of antihypertensive in a hypertensive emergency is often dictated by hospital formulary or the individual

clinician's discretion, despite competing considerations. In patients presenting with hypertensive crisis does labetalol confer an advantage in reduction of blood pressure over other commonly used antihypertensives? CLUE was a multicenter, randomized, comparative effectiveness trial in which patients presenting with blood pressures ≥ 180 SBP or ≥ 120 DBP were randomized to treatment with either labetalol or nicardipine. Patients receiving nicardipine were more likely to reach the target reduction in blood pressure when compared with labetalol. A Cannon et al. post hoc analysis of CLUE, limited to only the parameters of hypertensive emergency also demonstrated nicardipine superiority in blood pressure reduction. Liu, DeRyke et al. demonstrated in a prospective, pseudo-randomized study in which patients presenting in hypertensive crisis with ischemic stroke were administered either nicardipine or labetalol in 24 h following admission. Assessment of the therapeutic response in the form of achieving the blood pressure target goal and time spent within goal demonstrated superiority for nicardipine. Clinical outcomes such as length of stay and mortality were unchanged between both groups. Grassi et al. conducted a randomized, parallel comparison cohort study of perindopril, amlodipine and labetalol. Patients presenting with blood pressures ≥ 180 SBP or ≥ 120 DBP were treated with one of the three antihypertensives. After the first hour of administration, labetalol showed superiority in blood pressure reduction but all three drugs were equal after two hours after administration. The literature suggests that with hypertensive urgency, perindopril, amlodipine and labetalol are equally effective in controlling blood pressure. In hypertensive emergent ischemic stroke, such as with Mr. M, nicardipine demonstrates a statistically significant advantage in blood pressure reduction when compared with labetalol, with no difference in clinical outcomes. As is the case with Mr. M, treatment with labetalol, which requires IV bolus, coupled with constant monitoring, made optimal management difficult. The second bolus of IV labetalol, overcorrected to 140/104 (a decrease in MAP of 27% in 1 h) because infrequently taken blood pressure measurements mislead the ordering physician. Therefore, despite labetalol and nicardipine being equally effective with respect to clinical end points, given the therapeutic response and convenience of drip infusion, nicardipine represents a superior modality in practice, particularly in the setting of ischemic stroke.

A COMPLICATED BUT VITAL RED BLOOD CELL TRANSFUSION Leland E. Hull; Katharine Downes. University Hospitals of Cleveland Case Medical Center, Cleveland, OH. (Tracking ID #2195700)

LEARNING OBJECTIVE #1: 1. Identify when transfusion may be necessary in the setting of warm autoimmune hemolytic anemia

LEARNING OBJECTIVE #2: 2. Recognize the limitations of crossmatching red blood cells in the setting of warm autoantibodies.

CASE: A 74-year-old Caucasian female with chronic anemia (baseline Hb10 g/dL), psoriasis, and osteoarthritis with knee replacement 1 month prior, presented as a transfer to the medical intensive care unit for acute hemolytic anemia, lactic acidosis, acute liver failure, and respiratory failure. She felt well until 2 days prior to presentation when she developed nausea, vomiting, worsening fatigue and jaundice and went to an outside hospital emergency room where her Hb was 3.5 g/dL. Patient had warm autoantibody and was unable to be crossmatched. She subsequently developed confusion and lethargy, was intubated for respiratory failure and worsening acidosis without adequate respiratory compensation and transferred to academic medical center ICU not sedated. Her ABG prior to intubation was pH 7.044, pCO₂ 16.1 mmHg, and pO₂ 16.4 mmHg, with calculated bicarbonate of 4.3 mmol/L. She was not responsive to verbal stimuli, but withdrew to noxious stimuli, and was diffusely jaundiced. No appreciable organomegaly. Labs upon transfer were significant for WBC 34.1×10^9 /L with 59% PMNs, 23% bands, Hb 3.2 g/dL, Hct 10.9% anion gap metabolic acidosis with bicarbonate of 9 mmol/L and AG of 31. She had new AKI and elevated troponin. AST and ALT were elevated and peaked at 5362 and 3397 U/L respectively. Total bilirubin was 10.6 mg/dL with direct bilirubin 6.8 mg/dL. Urinalysis showed large blood and only 3 RBCs. LDH was 6964 U/L, haptoglobin < 8 mg/dL, and lactate was 22.4 mmol/L at peak. DAT was IgG and C3 positive. Transfusion medicine was contacted given worsening lactic acidosis. She was transfused 4 units of antigen-matched but still incompatible RBC secondary to warm autoantibody, with subsequent resolution of her lactic acidosis and transaminitis, and improved mental status. The time from intubation to the start of transfusion was about 15 h, and included transfer between hospitals. She received treatment with corticosteroids and 5 day course of intravenous immunoglobulin (IVIG) for warm autoimmune hemolytic anemia (WAIHA). The trigger for her hemolysis was unclear (infectious work-up negative, ANA panel with positive anti-SSA Ab but without clinical features of Sjögren's syndrome, and CT Abdomen pelvis showed lymphadenopathy more suggestive of reactive process than primary lymphoma). She was discharged on prednisone taper with outpatient hematology follow-up.

DISCUSSION: The hallmark of treatment for patients with WAIHA is corticosteroids, with IVIG, and splenectomy for patients who are unresponsive or fail to maintain remission. However, prior to these therapies inducing remission of antibody production,

patients may require transfusion. The decision to transfuse can be a difficult one because autoantibodies may bind transfused RBC decreasing their survival with hemolysis and can interfere in pretransfusion alloantibody identification and compatibility testing necessitating time consuming specialized testing to remove the autoantibody to permit identification of alloantibodies. In some cases emergency released blood may be needed before testing is complete. The autoantibody activity may mask alloantibodies which, if present and not evaluated, may worsen the patient's hemolysis if antigen unscreened units are transfused. Anywhere from 12 to 40% of patients with warm autoantibodies have alloantibodies that could cause a hemolytic transfusion reaction. The risk of a hemolytic transfusion reaction is higher in this patient as she is a woman with risk of alloimmunization due to history of pregnancy and prior transfusion during surgery. In the end, the patient received antigen matched RBCs that were still incompatible because of reactivity with warm autoantibody. No set criteria exist to indicate transfusion is necessary. It may be indicated in the presence of reticulocytopenia suggesting aplastic anemia, and be urgently required with confusion and neurologic deterioration. Additionally, her worsening lactic acidosis suggests a conversion to anaerobic metabolism in the setting of anemia, with Hct less than 10% at lowest value. The patient did not have known coronary artery disease, but in a patient of older age one should also consider underlying CAD for lower transfusion threshold. For the managing clinician, in such a situation close coordination with the transfusion medicine team is necessary to expedite transfusion. The responsibility of the clinician is to contact transfusion medicine as soon as transfusion is being considered to discuss the urgency of the situation so that the risk of delaying transfusion for alloantibody testing (which can take upwards of 6 h at referral laboratories) can be weighed against the risks of delaying transfusion in an informed conversation.

A COMPLICATED PNEUMONIA Amrit Lamba; Deepa Bhatnagar. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2196386)

LEARNING OBJECTIVE #1: Identify an unusual cause of community acquired pneumonia

LEARNING OBJECTIVE #2: Discuss one complication of severe bacterial infections

CASE: A 54-year-old man was transferred from an outside hospital with refractory septic shock secondary to community acquired pneumonia. He had no prior hospitalizations and was otherwise healthy. He was empirically started on vancomycin and piperacillin/tazobactam. He had positive respiratory cultures collected on admission with *Acinetobacter baumannii* and microbiologic studies showed the organism was sensitive to all antibiotics. Despite antibiotic coverage, he experienced acute respiratory, liver and kidney failure. He required intubation with mechanical ventilation, dialysis for electrolyte abnormalities, and medical management of atrial fibrillation with rapid ventricular response. For his persistent hypotension he required four different vasopressor agents for several days. He also experienced complications of purpura fulminans—originally seen as edema of the hands and feet that gave way to dusky appearing distal extremities. These lesions progressed to complete necrosis with large bullae formation, sloughing of the skin and eventual auto-infarction of his digits. He recovered after a fourteen-day antibiotic course with improvement in his multi-organ failure. Following extubation, he suffered multiple seizures. MRI/MRA of the head revealed lesions in frontal, parietal, and occipital regions compatible with sub-acute ischemia and areas of hemorrhagic conversion. These ischemic areas were initially believed to be septic emboli. Extensive workup for a source of the emboli included lower extremity venous duplex studies, transesophageal echocardiogram, transcranial dopplers and pelvic MRA. Imaging failed to identify a source and CNS findings were subsequently believed to be thrombotic phenomena secondary to purpura fulminans. After a prolonged hospitalization, he continued to recover in a skilled nursing facility. Further history for risk factors of *Acinetobacter* was obtained once the patient stabilized. He was a longtime Louisiana resident and had a history of significant tobacco and alcohol abuse. He reported living in a FEMA trailer following Hurricane Katrina. His neighbor was in the US military with overseas deployments and recently died from an unknown respiratory illness.

DISCUSSION: *Acinetobacter baumannii* is an aerobic Gram-negative coagulase negative bacillus that is becoming increasingly important as a nosocomial infection. This bacteria is notorious for its significant methods of resistance to antibiotics and ability to survive on inanimate surfaces. However, it can also have a fulminant course when acquired in the community, even when sensitive to most antibiotics. Articles from Australia, Taiwan and Hong Kong have documented cases of this uncommon pathogen and its role in community acquired pneumonia. While it has been identified in fresh water and soil along with in normal skin and oropharyngeal flora, there is thought to be a link to this organism as a pathogen to wounded American soldiers returning from Iraq and Afghanistan, as well as a connection to people involved in natural disasters. This patient also exhibited another life-threatening condition of purpura fulminans. This condition is characterized by fever, hypotension, hemorrhagic infarction of the skin with tissue necrosis, DIC, and thrombotic occlusion of small and medium sized blood vessels. While mostly associated with severe infection from meningococemia, *Streptococcus* species, and *Haemophilus influenzae*, it

can be seen with other bacteria such as *Staphylococcus aureus* among others. According to a current literature review, it has not been previously seen with *Acinetobacter baumannii*. While it is common in the hospital to see a patient admitted with fever, cough and an infiltrate on chest x-ray, this case highlights an unusual organism causing community-acquired pneumonia. This particular case also demonstrates the rare complication of purpura fulminans and unusual CNS findings that may also manifest.

A CONFUSED, CARIBBEAN MAN WITH CALCIUM AND CELL LINE CONDRUMS Andrew Ip; Stuart Malcolm; Joyce Doyle. Emory University, Atlanta, GA. (Tracking ID #2200115)

LEARNING OBJECTIVE #1: Recognize Paraneoplastic syndromes, common and rare, in solid tumors

LEARNING OBJECTIVE #2: Understand electrolyte abnormalities due to paraneoplastic syndromes

CASE: A 61 year old Afro-Caribbean male, with recently diagnosed and untreated esophageal squamous cell carcinoma extending to the neck, was brought to clinic by his wife for altered mental status. Over the prior five days, the wife noted increasing confusion, decreased oral intake but no other specific complaints. The patient was sent to the ED where he was combative and oriented only to person. Vitals were BP 116/90, pulse 133, RR 18, and temp 37C. Notable on PE was a right sided neck mass measuring 11×15 cm. It was firm, warm and erythematous with a necrotic and purulent inferior region. Neurologic examination revealed no additional focal abnormalities and the rest of the exam was unremarkable. Labs showed a WBC of 112,000 (78 % neutrophil), Hemoglobin 13.2, Calcium 16.4, PTH 13.0, Magnesium 1.0, Phosphorus 1.9, Alkaline phosphate 235. EKG demonstrated sinus tachycardia, QT interval 312 ms and ST interval elevation consistent with hypercalcemia. Hypercalcemia of malignancy was suspected and the patient was started on aggressive IV normal saline, calcitonin, and bisphosphonates. The markedly elevated WBCs raised concern for infection vs leukemia vs a leukemoid reaction. Previous levels of WBC obtain through hospital records showed a rapidly rising WBC from 30,000 6 weeks ago, to 50,000 3 weeks ago raising the possibility of a paraneoplastic syndrome. On further review, a PET-CT 2 weeks prior demonstrated diffusely increased osseous uptake, a sign noted to be related to anemia or G-CSF administration. The patient's mental status improved with decreased calcium. Chemotherapy with carboplatin and paclitaxel and radiation were initiated. A decline in WBC to 38,000 resulted within 10 days. Throughout stay, the patient's potassium and phosphate remained low, requiring regular repletion until chemoradiation was started.

DISCUSSION: The patient's clinical course is exemplary of the devastation of paraneoplastic syndromes. Hypercalcemia of malignancy can be due to osteolytic metastases or due to PTH related protein (PTHrP). The calcium on admission was 16.4, which caused a comatose state and EKG changes. His PTH was 13.0 on admission (normal lab range 12.0–88.0), and there was no evidence of bony metastases, indicating his hypercalcemia was humoral from his squamous cell tumor. With reduction of calcium via binders and chemoradiation, calcium normalized. Granulocytosis, or leukemoid reaction, due to paraneoplastic syndrome, has also been described, but is less common in clinical practice. G-CSF, a glycoprotein that stimulates the bone marrow to produce granulocytes and stem cells, has been shown to be produced by particularly aggressive solid tumors. Although reported elsewhere, the combination of G-CSF and PTHrP producing tumor is very rare. Upon review of literature of Japanese cases, it is postulated that cell lines from squamous cell tumors that produce PTHrP may also produce G-CSF and IL-1a, which would explain why leukocytosis and hypercalcemia can occur in the same patient with a squamous cell carcinoma. Of interest is the plausible explanation of the patient's other lab values. Phosphate remained continually low until chemoradiation, an effect of the phosphaturia induced by PTHrP. Hypokalemia persisted, requiring daily repletion until chemoradiation resulted in stabilization at normal values. A possible explanation for initial hypokalemia may be attributed by the higher respiratory consumption of greatly increased numbers of leukocytes with NaK-ATPase activity resulting in decreased extracellular levels. The case provides an example of the important of literature review for guidance and the necessity of prompt cancer treatment; the astute physician should always suspect paraneoplastic syndromes despite rarity when tumor growth is so rapidly visible.

A CORTISOL CONDUNDRUM IN AN HIV-POSITIVE PATIENT ON ARVS Jonathan M. Giftos; Stella Safo. Montefiore Medical Center, Bronx, NY. (Tracking ID #2199083)

LEARNING OBJECTIVE #1: To highlight a rare but reversible mimick of lipodystrophy commonly seen in HIV-positive patients on ARVs

LEARNING OBJECTIVE #2: To describe the pharmacodynamics underlying exogenous Cushing syndrome in patients receiving co-administered ritonavir and an inhaled corticosteroid

CASE: A 50 year old man with HIV and asthma presented with 6 weeks of progressive lower extremity swelling and an 80 lbs weight gain over the past year. Exam was notable for a normal JVP, bilateral expiratory wheezes and a distended abdomen with marked caput medusae. There was no fluid wave or shifting dullness. He had a round face, a dorsocervical fat pad and striae over his upper extremities. He had 2+ pitting edema in both legs extending to the groin. Lab tests were notable for normal pro-BNP, normal liver function tests, preserved kidney function and lack of proteinuria. Duplex of the IVC and the deep veins of the legs showed no obstructed flow. CXR revealed multiple healing rib fractures. A review of prior pelvic MRI revealed avascular necrosis of the hips bilaterally. A random cortisol level was determined to be undetectable (0.0) consistent with exogenous Cushing syndrome. On further questioning, it was determined that for the past 2 years patient was on an antiretroviral regimen that included ritonavir. We also discovered that one year prior to admission patient was started on an inhaled corticosteroid, fluticasone, for poorly controlled asthma.

DISCUSSION: This case represents an example of exogenous Cushing syndrome in a patient taking an inhaled corticosteroid co-administered with ritonavir. It highlights a rare but reversible mimick of lipodystrophy commonly seen in HIV-positive patients taking antiretroviral medications. Lipodystrophy is marked by the abnormal production and storage of fat. It includes both the loss of fat (lipoatrophy) and the abnormal accumulation of fat (lipohypertrophy) in certain parts of the body. Lipodystrophy is prevalent in the HIV-positive population with studies reporting 30–80 % of patients affected. While there remains some dispute over the precise etiology of the disorder in HIV-positive patients, it is thought to be a side-effect of certain antiretroviral (ARV) medications such as protease inhibitors (PI) and thymidine analogue nucleoside reverse transcriptase inhibitors (NRTI). ARV-induced lipodystrophy presents clinically with a dorsocervical fat pad (“buffalo hump”), central adiposity (“protease paunch”) and thin extremities. Cushing syndrome, which results from increased endogenous or exogenous glucocorticoid exposure, represents another important cause of acquired lipodystrophy and presents with many overlapping symptoms. An important distinction between the disorders can be noted in the patient's face: ARV-induced lipodystrophy commonly presents with temporal wasting and loss of subcutaneous buccal fat while Cushing syndrome presents with fat accumulation in these areas leading to the classic “moon facies” finding on physical exam. Given the prevalence of lipodystrophy in patients with HIV, signs of overt cortisol excess may be mistakenly attributed to simple ARV-induced lipodystrophy. As our case illustrates, however, inhaled corticosteroids co-administered with ritonavir also can cause exogenous Cushing syndrome and represents a unique and reversible cause of lipodystrophy in the HIV-positive population. Ritonavir is an integral part of protease inhibitor based ARV regimens that is used to boost the plasma concentration of other PIs. Ritonavir inhibits the enzyme cytochrome P450-3A4 (CYP3A4), which allows for lower levels of other PIs to be used, thereby reducing the adverse effects and pill burden that historically made adherence to these regimens so difficult. Fluticasone is an intranasal or inhaled glucocorticoid that is also metabolized by CYP3A4. The effects of inhaled corticosteroids are usually limited to the upper and lower airways with negligible systemic effects. However, when fluticasone is taken with ritonavir, the decreased function of CYP3A4 may result in increased systemic levels of the steroid. As our case illustrates, levels of the steroid may increase to such a degree that Cushing syndrome and lipodystrophy become apparent. The lipophilic properties and long half life of fluticasone make it a common candidate for this adverse reaction. Therefore, it is recommended that patients on ritonavir containing ARV regimens who require inhaled corticosteroids be placed on an alternative inhaled steroid such as beclomethasone or budesonide, both of which have a lower affinity for the glucocorticoid receptor and shorter elimination times. Although considered safer, there are recent case reports of Cushing syndrome caused by these steroids as well. Alternatively, decreasing the prescribed dose of ritonavir or changing ARV regimens altogether may be required to prevent the development of exogenous Cushing syndrome.

A CURIOUS CASE OF CERVICAL GOUT Tahmina Begum¹; Mashrafi Ahmed². ¹TTUHSC, Amarillo, TX; ²Texas Tech University, Amarillo, TX. (Tracking ID #2197340)

LEARNING OBJECTIVE #1: Recognize the diagnostic approach and pathophysiology of gout involving cervical vertebral column

LEARNING OBJECTIVE #2: Focus on the importance of early diagnosis and management of gout at unusual anatomical sites

CASE: A 73-year-old male presented with headache, neck pain, confusion and fever for 2 days. He mentioned that his pain initially started over the neck and gradually extended over the back of the head within 24 h. He also developed fever in last two days which was intermittent and never exceeded 101 F. His family members noticed occasional confusion in his behavior during this period. He did not experience any trauma. There was no sick contact. His past medical history was significant for hypertension, congestive heart failure, chronic kidney disease and gout. He mentioned that he was on allopurinol before but was not taking it during this illness. At presentation, his temperature was 99.8 F and mildly

tachycardic; other vital signs were within normal limits. On physical examination he had significant pain on neck movement on side to side and on both flexion and extension. Paraspinal muscles were taut but there was no erythema. His cranial nerves were intact and there was no focal neurological deficit. The remainder of the physical examination was normal. Upon admission, a lumbar puncture was done and the CSF analysis revealed mild rise in protein without any pleocytosis. The CSF culture was negative as well. An MRI of the cervical spine revealed multifocal facet arthropathy with facet joint effusions in C4-C6. Within 48 h of admission, the patient developed painful swelling of the left elbow and left 3rd metacarpophalangeal joint. Although the uric acid level was normal, but synovial fluid analysis from both the cervical joint and left elbow revealed typical monosodium urate crystals. The patient was started on prednisone and his symptoms started to reduce within 24 h. His symptoms completely resolved within 3 days of starting treatment.

DISCUSSION: Gout is the most prevalent inflammatory arthritis. It is an intensely painful disabling condition that occurs due to an inflammatory response towards monosodium urate (MSU) crystals in joints, bones, and soft tissues. The prevalence of gout among US adults in 2007–2008 was 3.9 % and it has been increasing for last two decades. The presence of MSU crystals in the joint is the main provocative factor for inflammation in the affected joint in acute gouty arthritis. Phagocytosis of MSU crystals by neutrophils and other cells like synovial cells, monocytes, and endothelial cells induces a cascade of complex reactions with subsequent release of various inflammatory cytokines. Gout usually presents as acute inflammatory monoarthritis, typically affecting the great toe MTP joint. In the present case, gout-related cervical spine lesions were apparent. This is a rare condition; only 16 such cases have ever been reported. In the literature, most of these patients were males. The lesions can occur in any area of the cervical spine, but are most frequently seen in C4-7. If severe neurological symptoms are present, orthopedic surgery is usually performed; otherwise a course of drug treatment is prescribed. Physicians are reminded to keep gout in the differential of acute or chronic neck pain in older patients with a history of gout.

A CURIOUS CLOT: PULMONARY VEIN THROMBOSIS WITH ATRIAL EXTENSION Natalie Chavarria¹; Dr. Daniel Wang¹; Radha M. Rao²; Jeffrey T. Bates¹. ¹Baylor College of Medicine, Houston, TX; ²Michael E DeBakey, Houston, TX. (Tracking ID #2198472)

WITHDRAWN BY AUTHOR

A DIFFERENTIAL TO REMEMBER: PYLEPHLEBITIS IN A PATIENT WITH HIV PRESENTING WITH ABDOMINAL PAIN AND FEVER. Donielle F. Sliwa; Stephen Ryzewicz. Baystate Medical Center/Tufts University School of Medicine, Belchertown, MA. (Tracking ID #2197906)

LEARNING OBJECTIVE #1: Recognize pylephlebitis as part of the differential diagnosis in a patient with abdominal pain and fever, especially in patients with HIV/AIDS.

LEARNING OBJECTIVE #2: Recognize the challenge of deciding whether to initiate anticoagulation given the underlying etiology of pylephlebitis.

CASE: A 46-year-old male with a background history of HIV on HAART, Hepatitis C in remission, hypertension, hyperlipidemia, GERD and depression presented to the emergency room with epigastric pain, associated with mild nausea and loose, black stools. He took ibuprofen, pepto bismol and Alka-Seltzer at home without relief. In the emergency room, the patient developed a fever of 102.7, rigors and vomiting. Two weeks prior the patient had similar symptoms, which resolved. He denied sick contacts, recent travel or new food exposure. The remainder of the physical exam was significant for a heart rate of 120 and a stable blood pressure and respiratory rate. He had mild epigastric and right upper quadrant tenderness. There was no organomegaly or icterus. Initial laboratory studies demonstrated leukocytosis and elevated transaminases and total bilirubin. Lactate and lipase were normal. His most recent CD4 count was >1000 with a viral load of <50. Chest x-ray and abdominal CT with IV contrast were negative for acute processes. An abdominal ultrasound revealed biliary sludge without acute cholecystitis. EKG showed sinus tachycardia. The patient was started on IV fluids and antibiotics and admitted for further evaluation of a probable intraabdominal infection. Due to a continuing rise in the patient's transaminases and bilirubin, an MRI of the abdomen was completed and revealed thrombosis of the left portal vein, enlarged porta hepatis and reactive peripancreatic lymph nodes. Blood cultures grew *Klebsiella pneumoniae*, however stool and urine cultures were negative for growth. A diagnosis of pylephlebitis was made based on the presence of leukocytosis, fever and portal vein thrombosis. The patient was treated for 4 weeks with Levofloxacin. An outpatient work-up for thrombophilia was negative and due to the bacteremia being the likely cause of the portal vein thrombosis, anticoagulation was not initiated.

DISCUSSION: Pylephlebitis is an uncommon but critical diagnosis to make in patients presenting with abdominal pain and fever, especially those with HIV/AIDS. Diagnostic criteria include portal vein thrombosis, fever, and often, bacteremia. Although

pylephlebitis was universally fatal in the preantibiotic era, the morbidity and mortality have decreased with early identification and antibiotic management. There is data suggesting that people living with HIV and AIDS are at a 2 to 10 fold greater risk of venous thromboembolic disease compared to age-matched controls. Therefore, it is important to consider pylephlebitis in the differential diagnosis when evaluating HIV/AIDS patients presenting with these symptoms. Furthermore, anticoagulation in pylephlebitis is not well described in the literature, making the decision to anticoagulate these patients a difficult one. In the case of our patient, the etiology of the portal vein thrombosis was the pylephlebitis, making anticoagulation unnecessary with adequate antibiotic treatment. However, it is prudent to rule out underlying hypercoagulable states and to ensure complete response to antibiotics before deciding against anticoagulation.

A DIZZYING DIAGNOSIS Elisa H. Ignatius. Emory University School of Medicine, Atlanta, GA. (Tracking ID #2199589)

LEARNING OBJECTIVE #1: Recognize an atypical presentation of an increasingly diagnosed complication of breast cancer: leptomeningeal metastasis

LEARNING OBJECTIVE #2: Recognize that despite improvement in peripheral disease, systemic chemotherapy may not fully cross the blood-brain barrier and patients can still develop CNS metastasis

CASE: A 52-year-old female with a history of prior stroke and stage III triple negative breast cancer treated with cyclophosphamide and doxorubicin presented with nausea and vomiting 6 days after her third cycle. She was diagnosed with chemotherapy-related nausea, started on multiple anti-emetics, and discharged home on hospital day 7 after gradual improvement. Three days later, the patient returned with nausea, vomiting, and dizziness at rest that worsened with ambulation and sitting upright. She denied headache, vision loss, or seizures but had left eye fullness and low back pain. She admitted excessive use of prochlorperazine since discharge, initially thought to be contributing to her presentation. On physical exam, her blood pressure was 160/100 mm Hg, heart rate 76 BPM, temperature 36.6 °C, respirations 14 per minute, with pulse oximetry 100 %, and non-orthostatic vital signs. Her exam was notable for intact extra-ocular movements, symmetric and reactive pupils, no nystagmus or papilledema and normal hearing. She was alert with intact cranial nerves, sensation, and reflexes, no dysmetria but decreased (4/5) strength of her left leg that was chronic. Her dizziness prevented gait assessment. She had tenderness of her left maxillary sinus and right sternocleidomastoid. Laboratory studies were notable for blood urea nitrogen 9 mg/dL, creatinine 1.8 mg/dL, white blood cell count (WBC) 8.3 K/mcL, hemoglobin 9.9 g/dL (mean corpuscular volume 82), and platelets 228 K/mcL. Cardiac enzymes were negative. Brain computerized tomography showed chronic microvascular changes and layering fluid in her sphenoid sinus. X-ray of her lumbar spine showed degenerative changes. She was started on meclizine, scopolamine patch, anti-emetics, nasal spray, and amoxicillin clavulanate. After failing to improve, magnetic resonance imaging (MRI) of her brain redemonstrated chronic microvascular disease. A positron emission tomography (PET) scan showed decreased size and hypermetabolic intensity of her right breast mass and diffusely resolved FDG nodal activity. She developed pre-syncope episodes concerning for seizures but EEG showed no epileptiform activity. Her dizziness and neck pain remained refractory to numerous therapies so lumbar puncture was performed. LP showed opening pressure 50 cm water, glucose <10 mg/dL, total protein 294 mg/dL, and WBC 33, 38 % of which were undifferentiated cells. Her dizziness and neck pain immediately resolved. Cytology showed malignant cells with identical cytologic features as her prior breast biopsy, confirming the diagnosis of leptomeningeal carcinomatosis. Neurosurgery placed an intraventricular catheter and she was started on dexamethasone and intrathecal chemotherapy prior to discharge.

DISCUSSION: This clinical vignette demonstrates an atypical presentation of an increasingly recognized complication of breast cancer and the need for high clinical suspicion to diagnose leptomeningeal metastasis (LM). LM occurs when there is spread to the subarachnoid space and cerebrospinal fluid (CSF); it is most often associated with melanoma, breast and lung adenocarcinoma. Approximately 2-5 % of patients with metastatic breast cancer have symptomatic LM disease but higher rates (5-16 %) have been shown on autopsy. Prognosis is dismal with average survival 4-6 months. Symptoms reflect increased intracranial pressure and include headache, cranial nerve deficits, cerebellar signs, nausea, vomiting, and mental status changes. Diagnosis is based on CSF cytology, yet 45 % are negative on first attempt. Diagnostic yield improves to 80 % with a second pass, but little more is gained from additional attempts. Classic CSF findings include elevated opening pressure, high protein, and low glucose. MRI with gadolinium may demonstrate leptomeningeal or cranial/spinal nerve enhancement but has a 30 % false negative rate. Treatment is palliative and includes intrathecal chemotherapy with methotrexate (plus systemic chemotherapy/radiation) and medications to reduce intracranial pressure. As shown by this patient's PET, CNS metastases may develop despite improving peripheral disease due to the selective permeability of the blood brain barrier to systemic chemotherapy. This apparent contradiction may be appropriate to discuss with patients.

LM represents a clinical challenge given its diverse presentations, frequently delayed diagnosis, and late treatment initiation. Diagnosis was gradual in our patient due to an atypical presentation and unremarkable imaging. Although swift recognition of LM results in earlier treatment that may halt neurologic progression and maintain neurologic quality of life, overall prognosis remains very poor.

A FULL HOUSE: RENAL DISEASE IN AN HIV-POSITIVE PATIENT Thomas Middour; Stacey Ullman; Margaret P. Huntwork. Tulane University Health Sciences Center, New Orleans, LA. (*Tracking ID #2198542*)

LEARNING OBJECTIVE #1: Explore the differential diagnosis of acute renal failure in patients with HIV

LEARNING OBJECTIVE #2: Discuss treatment options in immune complex mediated renal disease

CASE: A 55 year-old man with HIV presented with 6 months of intermittent nausea and vomiting in the absence of abdominal pain. He had no history of opportunistic infections, and was compliant with HAART therapy for 20 years. He denied fever, chills, change in bowel habits, or recent illness. On examination, a petechial rash was visible on the lower extremities and myoclonus was elicited in the left lower extremity. Initial screening labs demonstrated new onset pancytopenia (ANC 900/mm³) and acute renal failure (serum creatinine 4.0 mg/dL). Urinalysis and basic metabolic panel revealed new onset hematuria and proteinuria and renal tubular acidosis. The patient underwent workup for his new acute renal failure plus pancytopenia. Infectious testing was negative for hepatitis B, hepatitis C, CMV, or EBV. Bone marrow biopsy was normocellular and showed no evidence of infiltrative disease. Serologic evaluation revealed a positive direct Coombs' test, a polyclonal gammopathy (IgG and IgM), a weakly positive ANCA PR3, and hypocomplementemia. Tests for anti-nuclear antibody, anti-double stranded DNA, anti-Smith, anti-Ro, anti-La, and cryoglobulinemia were negative. Flow cytometry was negative for paroxysmal nocturnal hemoglobinuria and hematologic neoplasm. Due to progressively worsening renal failure (peak serum Cr 8.5 mg/dL), a kidney biopsy was performed. Biopsy revealed "full-house" immunoglobulin (IgA, IgM, IgG) and complement (C3, C1Q) deposition and severe tubulointerstitial nephritis. These findings are usually characteristic of type IV diffuse proliferative lupus nephritis. Repeat antinuclear antibody testing was again negative. Serology was weakly positive for anticardiolipin antibodies and negative for lupus anticoagulant. The patient met only 3 of 11 ACR lupus criteria and was ultimately diagnosed with lupus-like immune complex glomerulonephritis. He was initiated on the EuroLupus lupus nephritis induction protocol with methylprednisolone and cyclophosphamide. The patient's renal function moderately improved (serum creatinine to 1.5 mg/dL), although he was discharged on continued outpatient hemodialysis, glucocorticoids, and HAART.

DISCUSSION: Internists frequently encounter HIV in the inpatient and outpatient setting and must be able to recognize both common and uncommon HIV related complications. Although we commonly encounter kidney disease in HIV patients, a diverse spectrum of pathophysiological processes drives renal disease in HIV with varying prognoses and treatments. This case highlights a rare type of acute renal failure seen in HIV patients. Immune complex lupus-like proliferative glomerulonephritis in HIV patients is a form of kidney disease described in a limited number of case series. It may cause up to 4 % of CKD in HIV and is a distinct entity apart from HIV associated nephropathy (HIVAN) and HIV immune complex kidney disease. Biopsy series have shown nearly 40 % of suspected HIVAN, the most prevalent renal complication of HIV, receive alternative diagnoses on biopsy with immune complex disease an unexpectedly frequent incidental finding. This lupus-like nephropathy tends to occur more frequently in Caucasians and patients with high CD4 counts, and studies suggest a more aggressive course. This disorder's relationship to HIV and its therapies remain unknown and essentially unevaluated. Small studies have delivered contradictory evidence as to the risks and benefits of immunosuppression and HAART. Further, rare cases of concomitant SLE and HIV cloud the diagnostic picture, and may mask one another until treated due to the interplay of immunologic pathology in each disease. Our case demonstrates a rare, complex condition in an HIV patient that requires further study to understand its pathogenesis and treatment. In conclusion, HIV and SLE have rarely been reported in the same patient. A rare "lupus-like" glomerulonephritis has been recognized in patients with renal failure and HIV who fail to meet American College of Rheumatology SLE criteria.

A HAIRY SITUATION: COEXISTENT HAIRY CELL LEUKEMIA AND CHRONIC LYMPHOCYTIC LEUKEMIA Ramy Sedhom; Charles L. Liu; Jalal Baig; Ranita Sharma. Rutgers-Robert Wood Johnson Medical School, Harrison, NJ. (*Tracking ID #2195047*)

LEARNING OBJECTIVE #1: Identify the importance of flow cytometry in the diagnosis of hematologic malignancies.

LEARNING OBJECTIVE #2: Recognize the increased risk of secondary malignancy in both Chronic lymphocytic leukemia and Hairy Cell Leukemia.

CASE: Hairy cell leukemia (HCL) is a rare malignancy compromising only 2 % of leukemias. It is a risk factor for future development of secondary malignancies. It is not uncommon for hairy cell leukemia to evolve from a prior chronic lymphocytic leukemia (CLL) clone. However, simultaneous diagnosis of HCL and CLL is rare, with only few cases reported. We report a case of a 66-year-old male with simultaneous HCL and CLL who responded well to cladribine and rituximab chemotherapy. A 66-year old male presented with sub-sternal chest pain and progressive dyspnea of 3 days duration. He has no known past medical history. He denies medication, IV drug or alcohol use. He has 60 pack-year smoking history. Prior surgeries include appendectomy and tonsillectomy. His father died of leukemia. His chest pain was sudden in onset, sub-sternal, with radiation to his left arm. Pain was non-pleuritic and relieved by rest. Review of symptoms included easy bruising and night sweats of several weeks duration. He denied recent illness, fevers, weight loss, abdominal pain, epistaxis or mucosal bleeding. On admission, patient was afebrile, normotensive, with a pulse 70, respiratory rate 16, and O2 sat 99 % on room air. Cardiopulmonary and lymph node examination were unremarkable. Pertinent abnormal findings included diffuse petechiae on bilateral arms and legs. The spleen tip was palpated 3 cm below left costal margin. Basic profile was normal. CBC showed pancytopenia, with hemoglobin of 8.3 and platelets of 62. Troponins were positive and peaked at 0.9. EKG was normal sinus rhythm, with no dynamic ST changes or T-wave inversions. Chest pain resolved with one dose of nitroglycerin. Chest X-ray did not reveal active cardiopulmonary process. CT chest was negative for pulmonary embolism, with no masses or mediastinal lymphadenopathy. Cardiac echo showed no regional wall motion abnormalities. Abdominal ultrasound confirmed splenomegaly. Blood test work-up for pancytopenia revealed normal B12, folate, TSH level, ESR, and negative ANA. Serologies were equivocal for CMV, positive for EBV IgG and negative for parvovirus. HIV was negative. Kappa/Lambda free light chain ratio was normal. Peripheral smear showed numerous small mature lymphocytes with smudge cells. Hematology/oncology was consulted. Bone marrow aspirate was consistent with two separate populations of CD19 positive B-cells. A small population had immunophenotyping consistent with CLL. A separate distinct population of cells was positive for HCL markers CD 130, CD25, with co-expression of FMC7 and marker annexin A1. The patient was placed on neutropenic precautions. Induction chemotherapy consisted of cladribine and rituximab, specifically chosen with the aim of rapid improvement to allow intervention for suspected cardiac disease. Cardiac catheterization was held given chemotherapy induced thrombocytopenia and the risk of dual anti-platelet therapy. He tolerated his eleven day cycle of chemotherapy well without complaints. His platelets had a nadir of 23 and responded well to one unit of platelets. Cardiac catheterization was performed after platelet recovery and revealed 50 % stenosis of the mid LAD, 60 % stenosis of the circumflex, and 100 % occlusion of the mRCA. Despite triple vessel disease, he did not require PCI. He was discharged on metoprolol, aspirin, and atorvastatin. At his last follow-up visit, he reported being chest pain free. Repeat bone marrow has shown remission of his hairy-cell leukemia. His CLL is well controlled. He no longer requires treatment and is monitored every 6 months.

DISCUSSION: CLL and HCL are B-cell derived lymphoproliferative disorders with distinct morphologic features, immunophenotypes and clinical presentations. The simultaneous diagnosis of both is exceedingly rare. CLL is the most common leukemia in the western world and commonly encountered by internists. Hairy cell leukemia is 10 times more rare, often not seen even by practicing oncologists. Our case emphasizes the importance flow cytometry and the advantages of monoclonal antibodies in the diagnosis of lymphoproliferative disorders. Flow cytometric analysis was important diagnostically as two distinct clones of mature B-cells were revealed. Though clinical response was seen to cladribine and rituximab, future clinical trials are needed to standardize therapy.

A HEAD-TURNING CASE OF SYNCOPE Clark A. Veet. UPMC, Pittsburgh, PA. (*Tracking ID #2192928*)

LEARNING OBJECTIVE #1: Recognize the clinical features and pathophysiology associated with Bowhunter's or rotational vertebral artery syndrome.

LEARNING OBJECTIVE #2: Identify limitations in static imaging modalities when assessing patients with syncope.

CASE: A 62 year old female with history of coronary artery disease, type II diabetes mellitus, remote traumatic brain injury with subsequent seizures, and moderate aortic stenosis presented to the emergency department with three discrete episodes of syncope. The syncopal events occurred exclusively when she moved her head or arms, particularly when she looked upward and reached above her head. The patient had no prodromal symptoms including palpitations, dizziness, or diaphoresis. She denied any confusion, incontinence, or tongue biting after the episodes. Cardiac examination was regular and notable for systolic murmur. Neurological examination was unremarkable except for symptoms of vertigo and nausea with provoked horizontal head motion. With a presumed neurovascular etiology, the patient underwent multiple imaging studies. Non-contrast CT

of the head was negative for acute pathology. Brain MRI showed generalized cerebral volume loss and chronic microangiopathic changes. MR angiography of the neck showed atherosclerotic changes without hemodynamically significant stenosis. MR angiography of the brain showed no high grade stenosis. Carotid and vertebral ultrasonography with doppler showed no stenosis in carotid or vertebral systems. CT angiography of head and neck showed diffuse atherosclerotic calcifications in bilateral carotid bulbs but no significant stenosis. The vertebral arteries showed diffuse calcifications but no significant stenosis. The patient continued to have witnessed syncopal episodes with head movement and physical therapy. A cardiogenic source was considered and tilt-table testing was performed illustrating a bradycardic response. However, her symptoms of vertigo and syncope were not reproduced, making vasovagal syncope an unlikely cause. An alternative diagnosis was considered, that of transient and dynamic arterial obstruction, and the patient was consented for catheter-based cerebral angiography with provocative movements. The test revealed normal bilateral carotid vasculature and normal co-dominant vertebral arteries in neutral stance. However, when the patient extended both arms overhead and turned her head to the left, occlusion of left vertebral artery in the V3 segment was seen and her symptoms were replicated. This finding was consistent with Bowhunter's, or rotational vertebral artery syndrome, with dynamic occlusion in the C1-C2 range.

DISCUSSION: Bowhunter's syndrome, also known as rotational vertebral artery syndrome, is a rare condition that occurs when dynamic, posturally-induced obstruction of head and neck arteries causes vertebrobasilar insufficiency. The phenomenon is a diagnostic challenge and often remains a mystery despite a plurality of traditional static imaging. Symptoms are reliably reproduced with head or arm movement and resolve with neutral positioning. Clinical findings most often include vertigo, tinnitus, syncope, or blurred vision that resolves with neutral gaze. Nystagmus is seen in the vast majority of patients with downbeating the most predominant feature. Pathophysiologically, the dynamic occlusion is thought to be caused by fibrous muscular insertions, osteophytes, or degenerative changes that cause a reduction in cerebral bloodflow by extrinsic impingement of vessels and resultant occlusion. The lesions are most often seen in the upper cervical levels. Given the need for movement to provoke occlusion, lesions are not detected on static imaging. Even non-invasive dynamic imaging may fail in diagnosis. One case series with angiographically proven Bowhunter's showed that dynamic doppler ultrasonography fails to detect stenosis in 50% of cases. Given the rarity of this syndrome, there is no universally agreed upon gold standard in diagnosis, though most sources recommend conventional angiographic testing in cases with high clinical suspicion. Along with history, physical, and imaging findings, this patient did have other features classically seen in Bowhunter's. Case series suggest that patients with satisfactory collateral flow in the Circle of Willis via communicating arteries tended to have longer latent periods before symptoms. In this patient, diffuse atherosclerotic disease and absent posterior communicating arteries contributed to the severity and immediacy of symptoms which occurred seconds after motion. Management of this rare phenomenon is not standardized. Conservative treatment includes lifestyle modifications and avoidance of precipitating movements, which was recommended in this patient. Neurosurgical referral should be considered when symptoms continue despite optimal conservative management and often includes cervical decompression.

A HEMATOLOGIC TWIST ON JOINT PAIN IN AN ELDERLY MALE Jill B. Feffer; Diane L. Horowitz; Jonathan E. Kolitz. North Shore-LIJ/Hofstra School of Medicine, Lake Success, NY. (Tracking ID #2152961)

LEARNING OBJECTIVE #1: Recognize the need to rule out an underlying hematologic neoplasm in an elderly patient who presents with new onset of inflammatory polyarthralgias

LEARNING OBJECTIVE #2: Include RS3PE on the differential diagnosis of joint pain and swelling as a less commonly known rheumatologic entity

CASE: Seventy-seven year-old man with history of Crohn's disease treated with 6-mercaptopurine complained of progressive diffuse joint pain associated with fatigue and distal extremity swelling, ankles worse than wrists, for 3 weeks. Prior to onset, he ambulated independently; at presentation, movement involving his lower extremities or back elicited severe pain. He denied personal or family history of rheumatologic disease, including enteropathic arthritis, or hematologic malignancy. Admission findings included low-grade fever and pancytopenia. Infectious workup was negative and bone marrow biopsy showed >10% blasts, so the patient was transferred to our tertiary center. Bilateral wrists and ankles were tender to palpation and markedly swollen but not warm nor erythematous, with 2+ nonpitting edema in his hands and 3+ nonpitting edema in his feet. ESR was markedly elevated (113) and nucleolar pattern ANA was borderline (1:40), but serologies including cryoglobulins and antibodies against dsDNA, Smith, CCP, SS-A, SS-B, RF, p- and c-ANCA and RNP as well as testing for HLA-B27 antigen were negative. X-rays of bilateral hands, wrists and knees were consistent with osteoarthritis without erosions. Repeat bone marrow biopsy and aspirate results were consistent with

MDS; cytogenetics showed a complex, highly adverse karyotype. Diagnosis was therapy-related myeloid neoplasm treated with prednisone taper followed by 5-azacitidine. Pains and mobility gradually improved although diuresis with furosemide did not reduce pedal edema.

DISCUSSION: Links between rheumatologic conditions and hematologic malignancies have been documented but are not widely known. We present a case of remitting symmetric seronegative synovitis with pedal edema (RS3PE)—defined as bilateral inflammatory polyarthralgias associated with prominent hand and/or pedal edema and negative RF, most commonly in elderly males—leading to new diagnosis of myelodysplastic syndrome (MDS). Retrospective cohort studies have identified statistically significant links between hematologic malignancies and seronegative polyarthralgias, and case reports have associated acute myeloid leukemia and MDS with specific rheumatologic conditions. New onset of inflammatory arthralgias in older patients should therefore prompt consideration of an underlying myeloid neoplasm, and studies are needed to investigate whether rheumatologic illness is a true paraneoplastic manifestation or shares a causative mechanism which could offer potential therapeutic targets.

A KILLER COMBINATION: HONEYDEW MELON AND METHADONE INDUCED HYPERKALEMIA Naveen Nannapaneni. Wayne State University, Royal Oak, MI. (Tracking ID #2190200)

LEARNING OBJECTIVE #1: Recognize the EKG changes seen with hyperkalemia.

LEARNING OBJECTIVE #2: Manage hyperkalemia in the acute setting.

CASE: Electrolyte abnormalities are prevalent in patients with end-stage renal disease as they have impaired mechanisms of regulation. Amongst them, hyperkalemia is common as the primary modality of potassium removal is absent. As a result, these patients must follow a specific diet to minimize the amount of intake and their serum level is closely monitored by nephrologists. Occasionally, lapses in this diet can lead to dangerous results, as presented in this case. A 62 year-old female with end-stage renal disease, hypertension and diabetes was brought to the emergency room via ambulance for a 1-day history of generalized weakness. She reported being in her usual state of health the day prior, enjoying a honeydew melon on a warm summer's day, and when she woke up the next morning she was unable to stand up and had to crawl on the floor to call an ambulance for help. She reported going to her last hemodialysis session two days prior where she had a full run of dialysis. Concurrently, she affirmed constipation after her dose of methadone for chronic back pain was increased several days prior. On physical exam the patient was noted to be bradycardic, 45 beats per minute. Neurological exam revealed decreased strength in all muscles along with a waxing and waning mentation. Laboratory studies showed a potassium >7mM/L. EKG showed peaked T-waves, prolonged PR-intervals & QRS-durations, and decreased p-wave amplitudes. In the ER calcium chloride, kayexelate, insulin, and dextrose were given. Nephrology was consulted and the patient underwent emergent dialysis with resolution of EKG changes and generalized weakness. She was discharged the next day after overnight monitoring and counseling on the importance of adherence to a renal diet.

DISCUSSION: Hyperkalemia is common in end-stage renal disease patients. While symptoms can include muscle weakness, the most concerning are the changes that manifest in the EKG: peaked T-waves, prolonged PR-intervals & QRS durations, decreased p-wave amplitudes, and bundle branch blocks which foretell of impending arrhythmia from a sine-wave. Our patient's hyperkalemia was precipitated by her eating an entire honeydew melon, a fruit high in potassium, compounded with her decreased ability to excrete potassium in the gut due to constipation, a mechanism of minimal excretion in normal patients but one which is up regulated in chronic kidney disease patients. Emergent treatment can be done with mechanisms of cellular shifts and total body removal of potassium. If EKG changes are present, cell membrane stabilization is also performed. Reiteration of the renal diet to patients with chronic kidney disease is crucial as hyperkalemia can result in mortality for these patients.

A LIFE-THREATENING COMBINATION: A SUPPLEMENT-DRUG INTERACTION IN A WOMAN WITH ACUTE CORONARY SYNDROME Elisabeth Poorman; Pieter Cohen. Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2197857)

LEARNING OBJECTIVE #1: Diagnose side effects of dietary supplement use in unexpected drug-drug interactions

LEARNING OBJECTIVE #2: Learn how to report adverse effects of dietary supplements

CASE: A 43-year-old obese woman with a history of asthma presented to the hospital with right-sided chest pain and shortness of breath. Two weeks prior, she presented to her primary care office with dyspnea on exertion. Over the following 2 weeks, her shortness of

breath occurred with progressively less exertion. A few days prior to admission, she began to feel right-sided chest pain with exertion. Medications included albuterol, fluticasone and a weight loss dietary supplement, SlimXtreme. Because of her chest pain, she was referred to the emergency department for evaluation. In the emergency department, her initial vitals were heart rate of 63, body mass index of 41, blood pressure 150/92, oxygen saturation of 100 % on room air. Her troponin was 0.09, and an electrocardiogram showed T wave inversions in leads V3 through V6. She was given a dose of sublingual nitroglycerin, and became acutely hypotensive, with a heart rate in the 30s. She was resuscitated with intravenous fluids. She also received aspirin 324 mg, clopidogrel 600 mg, atorvastatin 80 mg, and intravenous heparin. Her pain was not controlled with morphine, and her T wave inversions in V3 and V4 deepened. Troponin rose to 0.43. An urgent cardiac catheterization demonstrated a mid left anterior descending subtotal occlusion. The occlusion was stented with a 2.2 mm Boston Scientific Premier RX 24/2.25, and the patient was discharged home 2 days later in excellent condition. Her weight loss supplement was analyzed for the presence of active pharmaceutical ingredients using liquid chromatography- quadrupole time-of-flight mass spectrometry. Analyses revealed the presence of both sildenafil and papaverine.

DISCUSSION: The use of weight loss supplements is widespread across the United States. A recent cross-sectional survey of 9403 adults found that 15.2 % reported ever having used weight loss supplements. Only one in three users of weight loss supplements reported the use of their supplement to their health care provider. The law permits manufacturers to advertise supplements as weight loss aides even without evidence of their efficacy or safety. This has created a perverse incentive for manufacturers to include pharmaceutical products in weight loss supplements in order to achieve the advertised effects. Over the past decade, a variety of pharmaceuticals have been found in weight loss supplements, including fluoxetine, phenytoloin, and subitramine. However, to our knowledge, no weight loss supplement has before been found to contain both sildenafil and papaverine, two vasodilators more likely to be found in adulterated male enhancement supplements. Because the patient in our case was unknowingly consuming two pharmaceutical vasodilators, she had a life-threatening drug-drug reaction when she was treated with nitroglycerin for her acute coronary syndrome. This case illustrates that patients may be consuming pharmaceutical-adulterated supplements without their knowledge, and clinicians should consider supplements when unanticipated drug reactions occur. Clinicians should report cases of harm from supplements to the Food and Drug Administration because the FDA relies on these reports to identify dangerous supplements.

A MASQUERADING DIAGNOSIS: DISTINGUISHING BRACHIAL ARTERIAL EMBOLISM FROM ACUTE ISCHEMIC STROKE Tiffanie K. Jones; David J. Aizenberg. University of Pennsylvania, Philadelphia, PA. (Tracking ID #2197935)

LEARNING OBJECTIVE #1: Distinguish between acute limb arterial embolism and acute ischemic stroke as the cause of monoparesis

LEARNING OBJECTIVE #2: Treat limb arterial embolism with prompt surgical embolectomy rather than thrombolytic therapy

CASE: An 89-year-old gentleman presented to the outpatient clinic with a 1-day history of right arm weakness, pain, and paresthesias. The patient described his awakening from sleep with weakness and abnormal sensations in his arm ranging from pain to paresthesias including tingling and poikilothermia. His past medical history is significant for congestive heart failure, hypertension, hyperlipidemia, atrial fibrillation on anticoagulation, and paroxysmal ventricular tachycardia requiring an implantable cardioverter-defibrillator. One week prior to presentation, the patient's warfarin was held in anticipation of a generator change for his device. Prior to the procedure, his INR normalized, and his generator was changed without perioperative complications. His physical examination was notable for normal vital signs, grossly intact cranial nerves, mild cognitive impairment, reduced strength of the distal right upper extremity, preserved reflexes, and a non-palpable right radial pulse. The patient's cardiopulmonary examination demonstrated an irregularly irregular heart beat and clear lungs. EKG showed atrial fibrillation at 78 bpm. The patient was referred to the emergency department where his laboratory studies were notable for normal coagulation studies (INR 1.3, PTT 32.9), acute kidney injury (Cr 1.45), and a mild anemia (Hb 13.1). A head CT showed no acute intracranial abnormality. His CT angiogram of the right upper extremity revealed a right brachial artery occlusion after the origin of the profunda brachii. The patient was started on intravenous heparin, and a vascular surgery consultation was obtained. The patient was taken to the operating room on the following day for an embolectomy. While hospitalized, his strength improved, his acute kidney injury resolved, and a palpable radial pulse returned. He was discharged after 1 week to his primary care clinic with a low molecular weight heparin bridge to warfarin.

DISCUSSION: Acute brachial artery embolism is an important cause of monoparesis and acute limb ischemia [1]. Based on guidelines from the 2007 Inter-Society Consensus for the Management of Peripheral Arterial Disease, acute limb ischemia is characterized by the "sudden decrease in limb perfusion, usually producing new or worsening symptoms

and signs, and often threatening limb viability" [2]. This decreased perfusion may clinically manifest as pain, pallor, paresthesia, and pulselessness [1], which are features typically absent from acute ischemic stroke. Since brachial arterial embolism may result in acute limb ischemia, delayed or late diagnosis carries the risk of limb loss. Diagnostic tests including Duplex imaging, Doppler ultrasonography, and angiography are used to confirm the clinical diagnosis as well as to identify the suspected location of the emboli for operative planning [3]. Urgent surgical intervention is required to restore circulation to the compromised limb. This ambulatory patient presented to the outpatient clinic with a surgical emergency. The patient's history of weakness and paresthesias was consistent with a central nervous system ischemic event. Without the identification of an absent radial pulse, an acute ischemic stroke may have been the leading element of the differential diagnosis. In this case, the patient's physical exam increased the clinical suspicion for acute limb ischemia of the upper extremity. This patient had a known diagnosis of atrial fibrillation, which is thought to be the precipitating factor in approximately 80 % of the cases [1,4]. His INR was also subtherapeutic due to a recent procedure. Since an acute brachial artery embolus requires a surgical embolectomy within 24-h of presentation [3], immediate surgical referral is imperative. With prompt intervention, this patient had a successful outcome with full functionality restored to the affected limb. Literature Cited: [1] Holmstedt C, Chimowitz M. E-pearl: Brachial artery embolus mimicking acute stroke. *Neurology*. 2011 May 3;76(18):e86-7. [2] Norgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, Fowkes FG, TASC II Working Group. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). *J Vasc Surg*. 2007;45 Suppl S:S5. [3] Yamada T, Yoshii T, Yoshimura H, Suzuki K, Okawa A. Upper limb amputation due to a brachial arterial embolism associated with a superior mesenteric arterial embolism: a case report. *BMC Res Notes*. 2012 Jul 24;5:372. [4] Andole S, Harbinson P. Arterial embolism of axillary artery secondary to atrial fibrillation. *BMJ Case Rep*. 2011 Jun 9;2011.

A MATTER OF PATIENT AUTONOMY: CODE STATUS IN THE PERIOPERATIVE PERIOD Alexandra Marchetta²; Gina Luciano¹; Christine L. Bryson¹. ¹Baystate Medical Center, Springfield, MA; ²Baystate Medical Center, Ware, MA. (Tracking ID #2198283)

LEARNING OBJECTIVE #1: Recognize the importance of discussing goals of care and contingency plans for potential procedural complications, and development of a specific DNR/DNI re-implementation plan periprocedurally

CASE: A 78-year-old male with end-stage chronic obstructive pulmonary disease on home oxygen was admitted to the ICU after developing respiratory failure as a complication of a lung nodule biopsy. His code status was do not resuscitate/do not intubate (DNR/DNI) prior to the biopsy, but this had been reversed as per standard protocol for the procedure. A formal discussion with the patient concerning periprocedural code status was not documented. After the biopsy, the patient developed intrapulmonary hemorrhage and pneumothorax requiring intubation and chest tube placement, with his family's consent. He improved and was extubated on his second day of hospitalization. Later that day, the patient again developed respiratory failure and was re-intubated. The DNR patient consent form states that if the DNR order has been suspended during the perioperative period, discussions with the patient for reinstituting the DNR order must take place within the first 48 h postoperatively. Only a few hours occurred between intubations, and the patient was not clinically well enough to participate in a meaningful code discussion, thus leading the team to continue with the full code order. The next day, a family meeting was held during which many of the patient's family members expressed concern that the patient was re-intubated despite his previously documented DNR/DNI order. The family and patient ultimately decided to attempt extubation, with the understanding that he not be re-intubated. On day 4, the patient passed the weaning parameters and was extubated; he died soon after.

DISCUSSION: Patient autonomy can be compromised when a previously documented DNR/DNI code status is routinely reversed for a procedure. A preoperative or preprocedural discussion regarding code status and patient wishes in the setting of a procedural complication can mitigate this to a certain extent. This conversation ideally includes information about how anesthesia may be similar to resuscitation and how resuscitation is more likely to be successful in the OR. If the patient decides to suspend a DNR/DNI order for a procedure, a reinstatement plan can be discussed and agreed upon pre-procedurally to maximize patient autonomy in the event of a complication. In 1993, the American Society of Anesthesiologists recommended that the automatic reversal of DNR status for perioperative patients conflicted with a patient's right to self-determination. Despite these guidelines and the emphasis currently placed on respecting patient autonomy, many hospitals and institutions do not have a policy regarding DNR/DNI status in the perioperative period. Many institutions that do have a policy require automatic perioperative suspension of DNR/DNI orders. For all hospitalists and care team members of patients with clearly stated DNR/DNI orders, pre-procedure discussions should be held and documented to ascertain patient preferences in the event of a complication in order to maximize patient autonomy.

A MIXED UP CASE OF DYSPNEA Jessica Hohman; Michael T. Martyn. UCSF, San Francisco, CA. (Tracking ID #2199871)

LEARNING OBJECTIVE #1: Recognize the symptomatic triad of atrial myxomas

LEARNING OBJECTIVE #2: Develop a cost-effective approach to the workup of chronic dyspnea

CASE: A 56-year-old Caucasian woman with a history of anxiety presented to our academic primary care clinic to establish care. Since 2010, the patient had noted progressive dyspnea. A former competitive cyclist, she had been unable to ride for several years. On presentation, she reported that she was only able to walk ten feet before needing to stop secondary to shortness of breath and lower extremity discomfort. The patient endorsed palpitations, headaches, and sub-sternal cramping pain that would radiate to her jaw accompanying these episodes. She denied associated lightheadedness, vision changes, paroxysmal nocturnal dyspnea, orthopnea, lower extremity edema, numbness, or tingling. The patient reported a fragmented prior workup at several local urgent care centers in recent years, including a reportedly normal electrocardiogram and pharmacologic stress test. The patient's past medical history was otherwise unremarkable, and her family history was notable for the absence of cardiopulmonary disease. The patient was a former 30-pack-year smoker, and denied alcohol and drug use. She was not on any medications and denied any allergies. The patient was self-employed and paid for care out-of-pocket, repeatedly requesting judicious use of resources in her workup. On exam, the patient's vital signs were normal as was her ambulatory oxygen saturation. She was well appearing, but anxious. Her cardiac exam was notable for a regular rate and rhythm, a loud P2, and a soft systolic ejection murmur heard at the left lower sternal border; there was no jugular venous distension or lower extremity edema. The patient's lungs were clear, and she had no skin or nail findings. The rest of her exam was unremarkable. The patient's initial complete blood count, chest radiograph, and basic metabolic panel were within normal limits. Her electrocardiogram was notable for left atrial enlargement, but was otherwise normal without ischemic changes. A transthoracic echocardiogram was ordered, which showed severe left atrial enlargement, a pulmonary artery systolic pressure of 85 mm Hg, and a 4x4x7cm friable mass with multiple mobile components attached to the atrial septum that prolapsed into the left ventricle, causing near obstruction of the mitral valve. The patient was sent directly to the hospital for cardiac catheterization, which showed no evidence of coronary artery disease, and was admitted to cardiac surgery for urgent surgical resection of the mass given its high risk for embolization and complications, including sudden death. Pathology of the mass was consistent with an atrial myxoma. At the patient's follow-up visit 4 months later, she noted resolution of her dyspnea. She had just started cycling for the first time in several years.

DISCUSSION: Chronic dyspnea—or subjective difficulty breathing lasting for longer than a month—accounts for a significant number of primary care visits each year. Over 85 % of these cases are attributable to chronic obstructive pulmonary disease, heart failure, asthma, pneumonia, ischemic heart disease, interstitial lung disease, psychogenic causes, and anemia. Primary cardiac tumors—particularly atrial myxomas—are rare though with an incidence of less than 0.1 %. Early recognition and surgical intervention is key. Myxomas more commonly occur in women in the third to sixth decade of life and are usually sporadic. The majority are located in the left atrium and present with the classic triad of obstructive cardiovascular, embolic, and constitutional symptoms. Electrocardiogram (showing left atrial enlargement), transthoracic echocardiogram, and cardiac magnetic resonance imaging/computed tomography can be useful in making the presumptive diagnosis of an atrial myxoma. If a myxoma is suspected, transvenous biopsy should be avoided given the high risk of embolization, and a patient should proceed to immediate resection. Although atrial myxomas are rare, this case also highlights elements of a cost-effective approach to chronic dyspnea, a common primary care problem. An initial workup consisting of a chest xray, electrocardiogram, complete blood count, basic metabolic panel, and pulse oximetry are evidence-based and affordable for charge-sensitive patients. When heart failure or pulmonary hypertension is suspected, a transthoracic echo represents value-based second-line testing (high-resolution chest computed tomography or exercise testing would alternatively be appropriate if other etiologies were more strongly suspected). In retrospect, it appears this patient likely was experiencing the classic symptomatic triad of an atrial myxoma dating back to 2010. Her case though highlights the difficulties encountered by primary care physicians in overcoming fragmented care and uninsurance and the importance of cost-effective diagnostics.

A NEAR MIX-UP: CHRONIC PALPITATIONS AS PRESENTATION OF ATRIAL MYXOMA Chadwick S. Richard. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2200654)

LEARNING OBJECTIVE #1: List the indications for echocardiography when a cardiac murmur is detected

LEARNING OBJECTIVE #2: Describe the management of atrial myxoma

CASE: The patient is a 54 year old female with hypertension who presented with palpitations that began 2 years ago. Initially, the palpitations occurred a few times per day and lasted several minutes in all positions, equally at rest and with exertion. She had no associated symptoms and no known history of rheumatic fever, atrioventricular valve pathology, coronary artery disease, or arrhythmia. Her mother had atrial fibrillation and her father had unspecified 'valvular disease'. She worked as a car salesperson, drank 4 cups of coffee daily, was a 29 pack-year smoker, occasionally consumed alcohol, and smoked marijuana daily. Her cardiopulmonary examination at this time was normal. Her 24 h Holter monitor revealed premature atrial and ventricular beats and several bouts of supraventricular tachycardia which did not correlate to timing of symptoms. She was treated more aggressively for her hypertension with lisinopril and atenolol. Over the ensuing two years, her palpitations increased in frequency to upwards of ten per day and duration up to several hours. She also began experiencing lightheadedness. Palpitations were now triggered by rising from a seated position and did not improve after she discontinued her lisinopril and atenolol. A week before admission to our service, she had prolonged palpitations with new non-exertional chest pressure and a sense of 'uneasiness.' She also suddenly developed palpitations associated with sweats, a choking sensation in her throat, and severe breathlessness. She was admitted to our service where her exam revealed a mid-diastolic 'plop' followed by a late apical diastolic murmur with a soft apical S1. Echocardiogram revealed a pedunculated 5x4cm mobile left atrial mass with dynamic obstruction of the mitral valve inlet and late mitral regurgitation. While awaiting surgical removal of her mass, she developed atrial fibrillation with rapid ventricular response which led to acute pulmonary edema and hypotension requiring aggressive Trendelenburg positioning and intravenous fluid boluses on the cardiac floor and later, continuous nodal blocking agents in the cardiothoracic ICU. Successful left atrial mass excision two days after her admission confirmed a benign atrial myxoma. The patient was discharged within a week of her surgery and is doing well.

DISCUSSION: This is a characteristic case of atrial myxoma with progressive palpitations and associated symptoms of intracardiac obstruction in a female who is thirty to sixty years old. Her presentation was notable for the absence of syncopal events or embolic phenomena, which occur in about a third of cases. Ninety percent of cases are sporadic, as was presumed in this case due to lack of definite family history, multiple tumors, or ventricular tumors to suggest familial myxoma. Although intracardiac tumors of all types are rare, lipoma, sarcoma, malignant myxoma, and metastatic carcinoma can all present in a similar fashion to benign myxoma. This case is consistent with the classic teaching to pursue echocardiography when a new diastolic murmur is detected. This is also in accordance with class 1 recommendations from the 2008 ACC/AHA guidelines for echocardiography which indicate evaluation in the presence of cardiorespiratory symptoms or a high probability for structural heart disease such as with a diastolic murmur. Perioperative care of this patient was notable for altered hemodynamics caused by the myxoma. Intermittent mitral inlet obstruction requires rapid maximization of end diastolic volume to decrease the obstruction. Thus the use of Trendelenburg and IV fluids is effective despite the presence of pulmonary edema. A profound intolerance to rapid atrial fibrillation was likely due to uncoordinated atrial contractions allowing prolonged tumor obstruction. The resultant drop in cardiac output and increased left atrial filling pressures resulted in worsened pulmonary edema and hypotension. Surgical resection is the definitive management of atrial myxoma. Identification of an intracardiac tumor should prompt urgent cardiothoracic surgical evaluation and appropriate surgical risk assessment.

A NEGATIVE QUANTIFERON-TB GOLD IN-TUBE ASSAY IN ACTIVE MILIARY TUBERCULOSIS Nena S. Auraha; Ruchir Patel; Herman Dyal; Juan Fernandez; Bruno Digiovine. Henry Ford Hospital, Detroit, MI. (Tracking ID #2194110)

LEARNING OBJECTIVE #1: To recognize and interpret QFT-GIT appropriately

CASE: A 73-year-old female was admitted with cyclic fevers for 6 months associated with weakness, headache, and one episode of cough with blood-tinged sputum. History revealed that in her 20s, she was exposed to a co-worker with TB and had negative PPD skin test after this exposure. Examination did not reveal any significant findings. Lab studies showed hemoglobin 9.9 g/dL, platelet count 21 K/uL, and white blood cell count 2.4 K/uL with 92 % neutrophil, 8 % lymphocyte. Quantiferon-TB Gold assay was negative. Chest radiography revealed opacities in bilateral lung fields. CT showed diffuse miliary nodules, as well as ground glass opacities and scattered larger nodules. After intubation for acute respiratory failure, AFB cultures showed positive result with rRNA by direct amplified nucleic acid probe. Patient was started on Rifampin, Isoniazid, Pyrazinamide, and Ethambutol.

DISCUSSION: Clinical presentation of miliary TB is highly variable. Diagnosis of active miliary TB may be achieved through testing including the tuberculin skin test, chest radiography, nucleic acid amplification test of *Mycobacterium tuberculosis* and/or pathological examinations. The QFT-GIT test has gained popularity in use for diagnosis because of reported rates of high sensitivity and specificity. Retrospective studies have recently shown that indeterminate or false negative results with QFT-GIT may be higher in elderly patients, severely ill patients requiring ICU stay, and those with lymphocytopenia. When

patients present with testing concerning for miliary TB, QFT-GIT results should be interpreted carefully as false negative results may occur in some patient populations—this includes the elderly, severely ill patients, and those with lymphocytopenia.

A NONINFECTIOUS CAUSE OF FEVER AND BANDEMIA Erica Altschul; Wei-Lin Yang; Varinder Kambo. Lenox Hill Hospital, New York, NY. (*Tracking ID #2153941*)

LEARNING OBJECTIVE #1: Recognize noninfectious causes of recurrent fever

LEARNING OBJECTIVE #2: Diagnose Adult Onset Stills disease

CASE: A 22 year old female was admitted to the hospital for workup of a 4 week history of fevers, chills, arthralgias, and new onset of a rash. The symptoms started several days after an upper respiratory infection and was initially associated with conjunctivitis, which had resolved. Prior to admission she was seen by multiple providers in various healthcare settings including emergency departments, urgent care centers, and primary care offices. She had extensive laboratory testing that was negative for mononucleosis, strep throat, hepatitis, acute HIV, and rheumatoid arthritis. During ED visits, she presented with fever and tachycardia that would improve with oral Tylenol and IV fluid hydration, and subsequently be discharged home with a diagnosis of an unspecified viral syndrome. On two separate occasions, she completed a course of oral antibiotics (Augmentin and azithromycin) without a change in her clinical status. Her symptoms resolved temporarily while she was taking a short course of oral prednisone for suspected sinusitis. Days prior to the hospital admission she noted the appearance of a pink-colored, patchy rash on her extremities that were painful to touch. Her past medical history included IBS, gluten sensitivity, and lactose intolerance. Her home medications included Prilosec and Tylenol. Family history was noncontributory and her social history was unremarkable. On arrival to the hospital, she had a fever of 101.0 F and heart rate of 144 bpm. Her blood pressure and respiratory rate were within normal limits. Her physical exam was pertinent for cervical lymphadenopathy, bilateral upper abdomen tenderness, hepatosplenomegaly, and a maculopapular non-blanching rash on bilateral legs that was tender to palpation. Abnormalities in her blood work included bandemia of 27 % without leukocytosis, hemoglobin of 10 gm/dl, elevated CRP and ESR at 10.6 mg/dl and 120 mm/hr respectively, elevated LDH at 437 U/L, elevated ferritin at 613.7 ng/mL, as well as mild transaminitis with AST at 108 U/L and ALT 195 U/L. Serology studies including Parvovirus B19 resulted in normal IgM but elevated IgG levels. Urinalysis was within normal limits. Multiple sets of blood and urine cultures were negative for bacterial growth. A transthoracic echocardiogram to assess for endocarditis was negative and a CT abdomen/pelvis confirmed splenomegaly, but was otherwise unremarkable. During hospitalization the patient noted that the severity of her rash coincided with her peaks in temperature. Given her presenting symptoms, hepatosplenomegaly, and elevated LDH and ferritin, the patient was diagnosed with Adult Onset Stills Disease. IV Solu-medrol, 16 mg every 12 h was initiated and complete resolution of her symptoms occurred within 24 h. She was discharged home on Prednisone 40 mg oral daily with outpatient rheumatology follow up.

DISCUSSION: AOSD is a rare multisystemic complex autoinflammatory disorder. The most common symptoms include high fever, polyarthritis, lymphadenopathy, evanescent rash, sore throat, and leukocytosis. It usually affects young adults with a mean age of 36 and incidence of less than 0.16–0.4 per 100,000 persons worldwide. Diagnosis is challenging as the clinical presentation mimics a wide variety of infectious, neoplastic, and autoimmune disorders. Several classification criteria exist, the most sensitive and accurate being Yamaguchi. It requires 5 or more criteria, of whom 2 must be major (fever >39 °C lasting 1 week or longer, arthralgias or arthritis lasting 2 weeks or longer, typical rash, and leukocytosis >10,000 with 80 % PMNs). Our patient met 6 of the Yamaguchi major and minor criteria. Corticosteroids control the disease in 65 % of patients with a rapid response, and is often tapered after 4–6 weeks. Data is limited, but DMARDs, IVIG, and biological agents have shown some efficacy when steroids fail. The etiology remains unclear, though it is theorized that infection can act as a trigger. Given the elevated IgG levels in our patient, a prior parvovirus infection may have been the cause. Patients with self limited or intermittent disease typically have systemic symptoms (fever, rash, serositis, and organomegaly), and are often able to achieve complete or a favorable prognosis. Though rare, AOSD should always be considered in patients with fever of unknown origin after infection or neoplasm has been ruled out as missed or misdiagnosed cases may result in lack of appropriate rheumatologic follow up and prevention of severe musculoskeletal complications.

A PAIN IN THE NECK Chelsea Rhoades; David Irwin; Blake Gregory. Alameda Health System—Highland Hospital, Oakland, CA. (*Tracking ID #2193030*)

LEARNING OBJECTIVE #1: Recognize a case of multiple myeloma in a woman presenting with clavicular masses.

CASE: A 42 year-old African American woman with hypertension presented to primary care reporting 6 months of left anterior shoulder pain. She denied recent traumatic injury, weight changes, or fatigue. She had a slight bony prominence over the medial aspect of the left clavicle that was mildly tender to palpation, without fluctuance or erythema. She had full range of motion of the shoulder, neck, and elbow. Her blood work revealed a white blood cell count of 3.7 thousand/ μ L with 15 % monocytes. There was no anemia or thrombocytopenia. Creatinine was 1.0 mg/dL, calcium was 9.5 mg/dL and albumin and total protein were normal at 4.0 g/dL and 7.6 g/dL respectively. Urinalysis was significant for trace protein. X-ray of the clavicles did not show fracture, lytic lesions, dislocation or arthritis. Two months later, her primary care provider ordered a CT angiogram of the head and neck to evaluate a neurologic complaint. The CT incidentally showed a left clavicular mass, approximately in 7 cm diameter, associated with destructive changes of the clavicle. Two 4 cm right clavicular masses with destructive bony changes were noted as well. Percutaneous biopsy of the masses revealed plasmacytoma. Bone marrow biopsy demonstrated hypercellularity with >90 % plasma cells. A bone survey showed lytic lesions in the left iliac wing and erosion of the bilateral clavicles. Immunofixation electrophoresis revealed a monoclonal band with lambda light chains. Quantitative lambda light chain level was 14,578 mg/L. Beta-2-microglobulin was elevated at 10.8 mg/L. IgE and IgD levels were low. These findings confirmed the diagnosis of light chain multiple myeloma. The clavicular masses were treated with external beam radiation with marked improvement in her shoulder pain. Chemotherapy with cyclophosphamide, bortezomib, and dexamethasone was subsequently started and the patient continues to follow up closely with oncology.

DISCUSSION: The above report describes a woman with multiple myeloma and medullary plasmacytomas who initially presented with rapidly enlarging clavicular masses. Her case has many unusual features and departs from the classical description of multiple myeloma in the literature. The median age of onset for multiple myeloma is 70 years. Anemia is present in the majority of cases (78 %). Renal insufficiency is commonly present (48 %), as is high serum calcium (28 %) and elevated total serum protein. Bone pain is a very common presenting symptom (58 %), with lytic lesions usually evident on x-ray. Our patient was significantly younger than is typical for multiple myeloma and she had few if any of the lab abnormalities associated with this disease on initial presentation. While she reported bone pain, she did not have lytic lesions on x-ray. Biopsy of the rapidly growing neck masses enabled swift diagnosis in this case. Plasmacytomas are localized plasma cell tumors, which can be solitary or a manifestation of systemic disease with multiple myeloma. Plasmacytomas are characterized as extramedullary, arising outside the bone, or medullary, arising from the bone in the form of lytic lesions. In the case of our patient, the presence of soft tissue masses with bony destruction was diagnostic of medullary plasmacytomas (MP). A review of the literature reveals that the vast majority of plasmacytomas of the head and neck are nasopharyngeal rather than clavicular masses. While we have found several cases in the literature that describe MPs presenting as masses arising from the clavicle, most of these plasmacytomas remained a solitary mass or evolved to multiple myeloma months to years after initial presentation. It is exceedingly rare for multiple myeloma to initially present as rapidly enlarging clavicular masses, as was the case in our patient. While an unusual cause of clavicular masses, this case demonstrates that multiple myeloma with MPs can rarely present in younger patients who have normal basic labs.

A PAIN IN THE STOMACH: A CASE OF ACE-INHIBITOR INDUCED ANGIOEDEMA OF THE INTESTINE. Mugdha Agrawal¹; Lisa Sanders². ¹Yale New Haven Hospital, New Haven, CT; ²Yale School of Medicine, New Haven, CT. (*Tracking ID #2196690*)

LEARNING OBJECTIVE #1: To distinguish and treat a relatively rare condition, ACE-inhibitor induced angioedema of the intestine (AI) from other common etiologies of non-specific abdominal pain, nausea, vomiting. To underscore this, we describe the case of a 34 year old female who presented with episodic nausea, vomiting and abdominal pain. She was thought to have AI after an unremarkable work up. Upon cessation of lisinopril, her symptoms resolved and she remains symptom free 4 months after discharge.

CASE: A 34 year old woman with history of hypertension and adenomyosis presented to the emergency department with nausea, vomiting, abdominal pain and anorexia. Her symptoms were intermittent and in between the episodes, she was in no distress and able to tolerate a normal diet. Over the seven hours since the start of her symptoms to our team's examination, the patient noted she had about 25 episodes of non-bloody, non-billious vomiting. Upon questioning, it was revealed that this was her fifth visit to a health care facility over the past month and a half for the same constellation of symptoms. Her home medications were lisinopril, HCTZ and OCP. Of these, only the OCPs were new, started not long before her symptoms started. She had been on lisinopril for several years. Her physical examination was unremarkable. Her work up before coming to the ED included a RUQ ultrasound and an abdominal x-ray which were unremarkable. In the ED, she had a CT of the abdomen and pelvis with IV and oral contrast which revealed ascites

and several loops of mild thickening of the small bowel walls. Her blood work which included comprehensive metabolic panel and lactic acid were normal. She had a mild leukocytosis with left shift on her CBC. The differential diagnosis at that time included ischemic bowel, gall bladder disease, infectious enteritis, vasculitis or ACE-inhibitor induced angioedema of the intestine. The patient was admitted to the hospital and started on IV hydration and pain control. Her lisinopril and OCPs were held. She was noted to be symptom free and tolerating a normal diet 24 h after her presentation. The patient was then discharged with the presumed diagnosis of AIAI precipitated by addition of OCP. Four months after discharge and discontinuation of lisinopril and OCP, the patient remains symptom free and has not had any additional visits to the emergency department. We therefore strongly believe that the patient had ACE-inhibitor induced angioedema of intestine precipitated by the addition of OCPs.

DISCUSSION: ACE-inhibitor induced angioedema of the intestine is a rare entity causing episodic and recurrent abdominal pain accompanied by nausea, vomiting and anorexia in patients. Although rare, this condition has been described in several case reports over the years. OCP use has also been shown to induce angioedema, both hereditary and idiopathic. OCPs and ACE-I work on separate pathways in the pathogenesis of angioedema. We believe that the addition of a second medication that could affect the pathway that leads to angioedema was the trigger resulting in AIAI. AIAI is a diagnosis established by exclusion. It should be suspected in a patient on an ACE-inhibitor with specific findings noted on imaging. The findings on CT abdomen in the appropriate clinical setting include ascites, small bowel wall thickening, dilatation, mesenteric edema and a “donut” appearance. The diagnosis is established by resolution of symptoms after cessation of the ACE-inhibitor. AIAI can occur after months to years of being on an ACE-I. This condition usually goes unrecognized for several years and causes significant emotional and financial trauma to the patient. The awareness of AIAI is important among clinicians given the high frequency of use of ACE-I in patients, delays in making diagnosis and high costs endured by the health care system as a result of this. Further, dysfunction of alternate diagnosis coupled with conservative and inexpensive treatment make the knowledge of AIAI an indispensable tool for physicians.

A PECULIAR PRESENTATION OF PAINLESS PRINZMETAL’S ANGINA
Naveen Nannapaneni. Wayne State University, Royal Oak, MI. (Tracking ID #2190203)

LEARNING OBJECTIVE #1: Recognize an atypical presentation of Prinzmetal’s Angina.

LEARNING OBJECTIVE #2: Distinguish Prinzmetal’s Angina from myocardial infarction.

CASE: A 48-year-old female with recurrent ovarian cancer, hypertension, and a history of mitral-valve replacement secondary to rheumatic fever presented to the ER with a 2-week complaint of intractable nausea, vomiting, and anorexia after her most recent round of chemotherapy. She reports having associated epigastric fullness with no bowel movement or flatus for approximately 4 days. On initial evaluation she was found to be hypotensive and borderline tachycardic. Physical examination exhibited dry oral mucosa, a mechanical heart sound radiating to the left axilla and diminished bowel sounds. Laboratory investigations revealed hyperkalemia, 6.5mMol/L, and an acute kidney injury, creatinine 2.45 mg/dL. Abdominal x-ray showed a high grade proximal small-bowel obstruction. Initial EKG showed sinus tachycardia without hyperkalemic changes. Hyperkalemia was treated with calcium gluconate, insulin and dextrose with gradual improvement. Serial EKGs revealed new J-point ST-segment elevations in the inferolateral leads with reciprocal changes. Cardiology was consulted for a possible STEMI, bedside echocardiogram revealed no wall motion abnormalities and serial troponins were negative while the patient had no chest pain. Coronary angiography revealed only mild luminal irregularities and the patient was started on isosorbide dinitrate for suspected coronary vasospasm. She underwent an exploratory laparotomy with lysis of adhesions, jejunostomy and feeding-tube placement for management of her small bowel obstruction. Her overall clinical condition subsequent to the surgery progressively deteriorated due to sepsis, leading to multi-organ failure and her eventual passing in palliative care after a month-long hospitalization.

DISCUSSION: The typical presentation of Prinzmetal’s Angina involves episodic anginal chest pain and ST-segment EKG changes suggestive of infarction without fixed obstruction on coronary angiography which is instead attributed to coronary vasospasm. Our patient showed these ST-segment changes without chest pain and had non-obstructive disease on coronary catheterization. Pseudoinfarction, a manifestation of hyperkalemia which can also have ST-segment changes, was ruled out given the normal EKG upon admission in the setting of hyperkalemia and the continued silent episodes in spite of hyperkalemia treatment. While unprovoked episodes of Prinzmetal’s Angina are common, this characterization of painless spasm is rare. There have been infrequent case reports associating painless presentations of coronary vasospasm with ventricular arrhythmias and even sudden cardiac death, highlighting the seriousness of the phenomenon. Ideally,

intracoronary acetylcholine challenge during coronary catheterization, which causes nitric oxide mediated coronary vasospasm, can be done for confirmation of the diagnosis. Risk factor reduction includes smoking cessation while treatment focuses on calcium channel blockers, nitrates and statins to reduce the frequency of episodes.

A PUFF OF SMOKE IN THE BRAIN: MOYAMOYA DISEASE IN A 25-YEAR-OLD FEMALE Anita Mulye; Christine L. Bryson; Farhad F. Bahrassa. Baystate Medical Center, Springfield, MA. (Tracking ID #2152136)

LEARNING OBJECTIVE #1: Recognize the clinical features, risk factors and relevant imaging of moyamoya disease

LEARNING OBJECTIVE #2: Describe the current options for management of moyamoya disease

CASE: A 25-year-old morbidly obese Caucasian woman Type 2 Diabetes Mellitus (hemoglobin A1c 10.1 %) presented to an outside facility with 1 day of acute right arm weakness and numbness with dysarthria. Family history included stroke in a great-grandmother and multiple sclerosis in a grand-aunt. She did not smoke or drink alcohol. The patient was non-adherent to medications including lisinopril, metformin and glargine but used a contraceptive patch. On presentation, vital signs were stable and she was afebrile. On physical exam she was alert and oriented with disordered speech. There was a slight drift of her right upper extremity and a decrease in rapid alternating movements. Sensation to pinprick was diminished from the right axilla to the digits. Laboratory studies included a sedimentation rate of 56 and C-reactive protein of 2.2. Antinuclear antibody was weakly positive with a homogenous pattern. Complement C3 level was elevated at 187. Complement C4 was within normal limits. Lupus anticoagulant, anticardiolipin, p-ANCA, c-ANCA, and Sjogren’s antibodies were normal. Protein C and S were normal. There was no prothrombin G20210A mutation. Prothrombin time, partial thromboplastin time, and thrombin time were all normal, thus coagulopathy was not suspected. Computed tomography of the head showed abnormal white matter hypointensities in the supratentorial brain with possible demyelination. Magnetic resonance imaging of the brain showed white matter changes, acute ischemia of the left frontal and parietal lobes, and areas of blood-brain barrier breakdown of the left corona radiata and centrum semiovale extending subcortically. Magnetic resonance angiography showed minimal flow in the right MCA, studded disease in the left MCA suggestive of vasculitis and irregularity of the right external carotid without narrowing at the aortic arch to suggest Takayasu’s arteritis. An echocardiogram with bubble study showed left ventricular ejection fraction of 55 % and no valvular abnormalities. The patient received aspirin and high-intensity statin therapy and returned to her baseline neurological status five days after symptom onset, but was transferred due to concern for an underlying vasculitic or rheumatological process. Computed tomography angiogram showed multifocal irregularity of the M1 branches with loss of enhancement in the distal right MCA. Finally, the patient underwent diagnostic cerebral angiogram, which revealed 99 % stenosis of the right MCA M1 segment and 50 % stenosis of the left MCA M1 segment with collateral flow via enlarged lenticulostriate arteries, as well as pial collaterals from PCA to MCA and ACA to MCA territories bilaterally. This was most consistent with a moyamoya disease pattern, hypothesized as the underlying etiology of the ischemic event.

DISCUSSION: The moyamoya condition is an entity first described in 1957 as bilateral hypoplasia of the internal carotid arteries. The Japanese term translates to “something hazy like a puff of cigarette smoke drifting in the air.” (1) It is a vasculopathy that predisposes an individual to cerebrovascular events such as stroke due to progressive narrowing of the internal carotid arteries and their branches. This does not involve atherosclerotic changes of the vessels, but rather hyperplasia of smooth muscle and luminal thrombosis resulting in vessel occlusion. Although thought to be more prominent in those of Asian descent, moyamoya has been described in various ethnicities, albeit at an incidence approximately 10 % of that found in Japan. There may be either polygenic or autosomal dominant inheritance, but identical twin studies in which only one sibling is affected seem to indicate that environmental factors play a larger role (2). Conventional angiography is the gold standard for diagnosis of moyamoya disease. Characteristic findings include stenosis or occlusion at the distal internal carotid artery and origin of the anterior and middle cerebral arteries. Abnormal vascular networks at the basal ganglia, or moyamoya vessels, represent the characteristic “puff of smoke.” Management of moyamoya is symptomatic with primary and secondary preventive treatments for acute stroke. Aspirin and lifestyle modification are recommended, but thrombolytic and antithrombotic therapies have not been investigated thoroughly. Surgical revascularization techniques such as angioplasty and bypass have been implemented to reduce the risk of ischemia. Although no randomized controlled trials have been done to evaluate the effectiveness of surgery, a systematic review found that 87 % of pediatric patients had complete resolution of symptoms over a mean post-operative period of 58 months (3). Nevertheless, Japanese studies have not shown a statistical significance in outcomes between medically and surgically treated groups (4).

A PULMONARY EMBOLISM THAT COULD KILL? Cameron Long; Jacey Jones. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2197884)

LEARNING OBJECTIVE #1: Identify criteria for submassive pulmonary embolism (PE)

LEARNING OBJECTIVE #2: Describe current treatment options for PE

CASE: A 34-year-old woman presents to the ED with 3 days of shortness of breath, chest tightness and scant hemoptysis. She has a history of hereditary anti-thrombin III deficiency (diagnosed in 1984) with recurrent deep vein thromboses in the left proximal leg veins and two pulmonary emboli. She is currently on warfarin with a therapeutic of INR 2.7. In the ED she is afebrile, has a blood pressure of 160/80 mm Hg, is saturating 95 % on room air, and is breathing at 20 breaths per minute. Her exam reveals vesicular breath sounds, jugular venous distension, and tachycardia with no other abnormalities. Given her known history of hypercoagulability and prior PEs, she undergoes a CT with PE protocol. The CT shows no contrast in right pulmonary artery as well as an enlarged right ventricle (RV), IVC dilation, and peripheral right lung infarcts. An emergent echocardiogram shows moderately enlarged RV, positive McConnell sign (minimal RV wall motion in diastole and systole with apical sparing), RV to left ventricle dimension ratio of 0.94 and increased pulmonary artery pressure at 65 mmHg. Doppler studies of her legs are also performed and show high clot burden in bilateral common femoral, external iliac, and popliteal veins. EKG is only remarkable for right atrial enlargement and tachycardia.

DISCUSSION: The patient has a PE conundrum. Pulmonary emboli are common and the vast majority of emboli are sub-segmental occurring in 1–1.5 % of asymptomatic patients detected by helical CT scanner. However, sub-massive PEs can be deadly due to acute hemodynamic compromise. The patient has objective data characterizing her PE as submassive due to RV strain on echocardiogram. However, her clinical picture reveals a stable patient who is actually hypertensive and saturating well on room air. The consensus statement from the 9th ed. ACCP in 2012 recommends administration of tPA in patients with submassive PE in the context of hypotension, increased RV strain, and no increased bleeding risk (grade 2C). In patients without hypotension, the guidelines recommend against tPA (Grade 1C). The patient, in this case, does not meet eligibility criteria for tPA for two reasons: she is normotensive and her INR is therapeutic. Another concern is whether this is an acute presentation of a PE. The CT imaging depicts a clot obstructing the entire right pulmonary artery which if acute would likely cause dramatic hemodynamic perturbations and shock. Her stability suggests a chronic process of her adapting to an obstructed right pulmonary artery. There are currently no guidelines for management of chronic PE. One study has investigated managing acute submassive PE initially with heparin alone vs. heparin+tPA and found that 27 % of those patients receiving heparin alone had significant pulmonary hypertension at a six month follow up, likely secondary to pulmonary artery remodeling due to hypoxic vasoconstriction. Therefore PEs left to dissolve on their own with oral anti-coagulation may place the patient at significant risk for pulmonary hypertension and morbidity long-term. Because the patient presents therapeutically anti-coagulated on warfarin, tPA is a contraindication. Taking the patient off anticoagulation to make her eligible for tPA will introduce the risk of clot formation and progression of her PE. Other options to consider in this circumstance are catheter directed thrombolysis, embolectomy, or anti-coagulation with a direct thrombin inhibitor. The patient ultimately decides to pursue the most conservative approach: opting for an argatroban drip followed by an oral factor Xa inhibitor at discharge. She remains stable during her hospitalization and is discharged with close follow up.

A RARE CASE OF CYTOMEGALOVIRUS INFECTION IN THE IMMUNOCOMPETENT PATIENT Erica V. Tate¹; Richard Hu². ¹Olive View UCLA Medical Center, North Hollywood, CA; ²Olive View UCLA Medical Center, Sylmar, CA. (Tracking ID #2194030)

LEARNING OBJECTIVE #1: Recognize Cytomegalovirus (CMV) infection in an immunocompetent host

LEARNING OBJECTIVE #2: Diagnosis CMV gastric infection with the study of choice, Esophagogastroduodenoscopy (EGD)

CASE: Fifty-one year old female with hypertension and diabetes presented with 1 month history of non-bloody diarrhea, abdominal bloating, mild abdominal pain, fatigue, and 20 lb weight loss after a trip to Mexico where she reported drinking well water. She experienced no fevers, chills, nausea, vomiting, blood, or mucus in her stool. Two weeks prior to hospitalization patient was examined at a nearby medical center and diagnosed with an uncomplicated urinary tract infection and giardia infection. Patient was treated with cefotaxime and metronidazole, EGD evaluation revealed 'large irregularly shaped antral mass with multiple ulcerations and erythema extending to the distal gastric body', routine biopsy samples were negative for H. pylori, CMV, and malignancy. Physical exam was not remarkable. Laboratory studies revealed eosinophils 31 %, negative Hepatitis A, B, C, and HIV.

Given the reported gastric antral mass and persistent symptoms along with previous non-diagnostic biopsy, a repeat EGD was performed which found multiple small gastric ulcers and one larger shallow gastric ulcer with irregular border. Extensive biopsy of the base and the rim of the ulcer were obtained, pathology exam showed evidence for CMV, no malignancy or H. Pylori. Patient was treated with valganciclovir 900 mg twice daily for a total of 14 days with resolution in symptoms.

DISCUSSION: Cytomegalovirus (CMV) is recognized as a common pathogen in immunocompromised patients, the colon and stomach are the most common sites of gastrointestinal infection by CMV [1]. However CMV infection is not common and rarely encountered in the stomach of immunocompetent patients. In immunocompetent patients physicians must have a high index of suspicion to make the appropriate diagnosis. In this case recent travel history, exposure to waterborne infections, and prior non-diagnostic EGD all made the final diagnosis elusive. The determining factor was the repeat EGD with extensive and targeted sampling. In diagnosis of CMV gastric infection the study of choice is EGD, as it allows direct visualization and biopsy. Often large solitary shallow ulcers or multiple lesions appear on EGD [2]. Some studies have shown at least ten biopsy specimens should be obtained to yield a significant result [2]. This was further supported by our case. Despite its infrequent presentation in immunocompetent patients, CMV infection should be considered in a patient with a gastric ulcer although PUD is the most common clinical entity. References: 1. Akira Hokama, Kiyohito Taira, Yu-ichi Yamamoto, Nagisa Kinjo, Fukunori Kinjo, Kenzo Takahashi, and Jiro Fujita. *Cytomegalovirus Gastritis*. World J Gastrointest Endosc. Nov 16, 2010; 2(11): 379–380 2. M Baig, S Ali, R Javed, M Khan, S Tabrez, D Subkowitz, J Vieira. *Cytomegalovirus Gastritis In Immunocompetent Patient: Case Report And Review Of Literature*. The Internet Journal of Infectious Diseases. 2005 Volume 5 Number 1.

A RARE CASE OF GRANULOMATOUS INTERSTITIAL NEPHRITIS DUE TO RENAL SARCOIDOSIS Asma Khatoon¹; Salman Raheem². ¹Methodist Dallas Medical Center, Dallas, TX; ²Physician Associates of Southwest Dallas, Dallas, TX. (Tracking ID #2151366)

LEARNING OBJECTIVE #1: Sarcoidosis received its name because the condition causes lesions resembling a sarcoma. It is an idiopathic multisystem granulomatous disorder primarily involving the reticuloendothelial system. It is pathologically characterized by the presence of noncaseating epithelioid granulomas in affected organs. A definitive diagnostic test for sarcoidosis does not exist. Instead, the diagnosis requires three elements—exclusion of other diseases that may present similarly, compatible clinical and radiographic manifestations and histopathologic detection of noncaseating granulomas. Renal involvement, defined by either histologic changes in the kidney or a decline in renal function in the absence of a biopsy, occurs in approximately 15 to 35 % of patients. The classic renal lesion is noncaseating granulomatous interstitial nephritis, but this rarely causes clinically significant renal disease.

CASE: A 26 year old African-American male with past medical history of pancytopenia and hepatosplenomegaly was transferred to our facility for evaluation of his acute kidney injury in early 2013. Patient presented with nausea, vomiting, anorexia and weight loss. The hepatosplenomegaly and pancytopenia was found in spring 2011. At that time lymph node, bone marrow and liver biopsies were nondiagnostic. He was found to have a serum creatinine of 4 mg/dL, his creatinine the year before was 1.4 mg/dL. There was no improvement of creatinine with hydration. Upon presentation to our facility, he was found to be normotensive and physical exam revealed pallor, hepatosplenomegaly but no lymphadenopathy, skin lesions or ocular involvement. His labs showed pancytopenia, elevated alkaline phosphatase and creatinine but normal calcium and angiotensin converting enzyme levels. The urinalysis indicated sterile pyuria, low specific gravity, proteinuria and significant eosinophiluria. The chronic kidney disease workup was negative. Imaging indicated nephromegaly and a normal CT of the chest. Bone marrow and kidney biopsies were obtained. The bone marrow biopsy showed extensive noncaseating granulomatous inflammation. Stains for acid fast bacilli and fungal elements were negative. Kidney biopsy revealed granulomatous interstitial nephritis with focal tubular injury. Patient was started on pulse dose steroids: solumedrol IV daily for three days and then switched to prednisone. He was also started on Bactrim for PCP prophylaxis. He had excellent response to the treatment with improvement in his pancytopenia and creatinine.

DISCUSSION: Renal involvement in sarcoidosis can occur in a variety of ways most common of which include abnormal calcium metabolism, nephrolithiasis and nephrocalcinosis. Glomerular disease, obstructive uropathy, and end-stage renal disease may occur infrequently. It can also present as a rare form of interstitial nephritis with noncaseating granulomas. Typical tubular manifestations include mild proteinuria, sterile pyuria and impaired ability to concentrate urine. Early recognition and initiation of therapy is critical to avoid morbidity and mortality. This particular case presentation had several interesting features viz., absence of overt systemic sarcoidosis, normal serum calcium and angiotensin converting enzyme levels, dramatic response to corticosteroid therapy and most importantly no pulmonary involvement.

A RARE CASE OF OSMOTIC NEPHROPATHY Rishi Kumar; Mrinalini Krishnan. Pinnacle Health, Harrisburg, PA. (Tracking ID #2199170)

LEARNING OBJECTIVE #1: Recognize a rare side effect of a commonly prescribed medication

LEARNING OBJECTIVE #2: Diagnostic approach to renal failure when initial work up is negative

CASE: A 69 year old female with a medical history of diabetes mellitus and hypertension presented to the emergency department with a 1 week history of anuria. She experienced nausea and vomiting that was not relieved by ondansetron. The patient's medications included metformin, losartan-hydrochlorothiazide and amlodipine. Of note, the patient had discontinued saxagliptin therapy for diabetes approximately 2 months prior. Physical examination was unremarkable, and laboratory work revealed blood urea nitrogen level of 58 and creatinine level of 7.88, with normal renal function documented one year prior. Urinalysis showed trace blood and was negative for protein. Fractional excretion of sodium was calculated to be 4.1 %, indicative of acute tubular necrosis. Complement levels, acute hepatitis panel and ANCA serologies were negative. Renal ultrasound revealed kidneys were within normal size limits. Despite aggressive IV fluid therapy, renal function declined and peaked at creatinine level of 8.79. Nephrology was consulted for evaluation; a renal biopsy was scheduled, and the patient was started on hemodialysis for anuria and completed two sessions. Renal biopsy revealed osmotic tubulopathy. Patient began diuresing within a few days, and was discharged home with renal function returning to baseline within a week. At present time, the patient's renal function remains stable without any recurrence of acute renal failure.

DISCUSSION: Osmotic nephropathy is a rare pathological pattern described as proximal tubular cell swelling secondary to vacuolization of the cell cytoplasm. This cause of renal failure has been associated with exogenous substances such as sucrose containing intravenous immunoglobulin (IVIG), dextrans, mannitol, contrast media and hydroxyethyl starch. Literature search revealed one reported case of osmotic nephropathy associated with concurrent use of saxagliptin. This case demonstrates the development of osmotic nephropathy presumably secondary to saxagliptin, despite the discontinuation of this medication 2 months prior to her renal decline. This case is important to highlight this potential side effect of saxagliptin, as renal failure is not a known adverse effect associated with this medication. Further investigation may be required to determine the implications of this medication on renal function.

A RARE CASE OF PERITONITIS CAUSED BY CANDIDA ALBICAN IN AN ALCOHOLIC LIVER CIRRHOSIS PATIENT Steve M. Antoine; Bisma Alam; Varada Nair; Amit Sharma. Upstate Medical University, Syracuse, NY. (Tracking ID #2199939)

LEARNING OBJECTIVE #1: Recognize a less common cause of peritonitis in liver cirrhosis and how to treat it

CASE: A 51 year old male with a past medical history of alcoholic liver cirrhosis, hepatic encephalopathy, abdominal ascites for the past 3 months which had required 2 paracentesis procedures (both were negative for any infectious process) and gastric bypass surgery over 7 years ago, presented to the hospital with worsening abdominal distention and abdominal pain. His pain was diffused and non-radiating, accompanied by subjective fever and chills. The patient denied any recent jaundice, no changes in bowel habits, no skin rashes. On presentation, he had a fever of 101.5 F. Physical examination revealed a cachectic appearing white male with distended abdomen and shifting dullness, diffusely tender to palpation in all quadrants. He did not appear to be jaundiced. Complete blood count revealed a slight leukocytosis of 10.9 with neutrophilic predominance. Patient underwent a diagnostic paracentesis, and was empirically placed on ceftriaxone therapy 2 g IV daily. The preliminary ascitic fluid analysis showed 503 WBC, 68 % PMN, 32 % monocytes. Despite being on antibiotic therapy, patient continued to be febrile over the next few days with complaints of worsening and diffuse abdominal pain. Peritoneal fluid culture after 2 days grew 2 colonies of *Candida albicans*. There was no evidence of candiduria or candidemia. Patient was started on Fluconazole 200 mg IV daily in addition to Ceftriaxone. Infectious disease specialists were consulted at that time and a repeat diagnostic paracentesis was performed. The second set of peritoneal fluid studies revealed a double in the number of WBCs compared to prior sample, and grew 100 colonies of *Candida albicans*, sensitive to Fluconazole. Infectious disease service recommended increasing fluconazole to 400 mg IV daily. Patient improved clinically 2 days after the fluconazole dose was increased. He was discharged on a 3 week course of PO Fluconazole 400 mg daily and follow up with Infectious disease as an outpatient.

DISCUSSION: Fungal peritonitis has been documented in the literature, in the setting of cirrhosis; Cleophas et al. described cases of *Cryptococcus neoformans* peritonitis that was found in patients with advanced hepatitis B associated cirrhosis. This has also been shown in Hepatitis C and H.I.V patients. *Candida albicans* peritonitis have been described in peritoneal dialysis patients. In this case, the patient did not have any of the above

mentioned risk factors. Two paracentesis procedures were done to confirm the diagnosis as *Candida* was initially thought to be a skin contaminant. The gastrointestinal tract is also a reservoir for *Candida*. A study performed by Choi, SH et al. isolated a group of cirrhotic patients with ascitic fluid cultures positive for *Candida* species who was not given any antifungal therapy. The study showed that within 1 year of therapy, all patients in that group had died. Our patient was treated with IV fluconazole as this was shown to have effective penetration into the ascitic fluid but at a higher dose. Other antibiotic regimens may have been considered such as caspofungin, micafungin, echinocandin or amphotericin B in combination with flucytosine. It is therefore imperative to consider *Candida* species when treating SBP in cirrhotic patients, that although, uncommon, can be associated with poor prognosis and poor overall outcome.

A RARE CASE OF SARCOID PRESENTING WITH HYPERCALCEMIC CRISIS Sonia Rajput; Nasser Mikhail. UCLA Olive View Medical Center, Sylmar, OR. (Tracking ID #2197765)

LEARNING OBJECTIVE #1: Hypercalcemia is commonly associated with malignancy and primary hyperparathyroidism, however up to 10 % of cases are seen in sarcoidosis.

CASE: A 54 year-old African American woman with a PMH of hypertension presented to the hospital with 1 month of fatigue, epigastric abdominal pain and ongoing vomiting. These symptoms were in the setting of 1 year of dyspnea, alternating sweats and chills, as well as a 34 lb unintentional weight loss. She denied cough, myalgia/arthritis, rash, recent travel, sick contacts, heavy NSAID or alcohol use or a FH of malignancy. She did not take any medications either. Upon evaluation, VS were normal. She was nontoxic appearing, but had diffuse wheezes and rhonchi bilaterally, inguinal lymphadenopathy, a benign abdomen, and tenderness to palpation along the spine with no step off. Laboratory analysis revealed hypercalcemia to 14.1 with a normal albumin, elevated phosphorus to 4.4, low-normal PTH of 15, low 25-hydroxyvitamin D of 18 and an elevated 1,25-dihydroxyvitamin D of 120. CT CAP showed multiple pulmonary micronodules, diffuse lymphadenopathy and lytic lesions of the thoracic spine. She was admitted to the ICU for hypercalcemic crisis and given IV fluids and pamidronate. Her calcium down-trended to normal. Workup for malignancy vs. infectious causes was negative including CEA, CA-125, LDH, peripheral smear, PTHrP, quantiferon gold and HIV. An inguinal lymph node core biopsy showed non-necrotizing granulomatous lymphadenitis concerning for sarcoidosis. She was started on prednisone with marked improvement of symptoms and sent home days later.

DISCUSSION: The mechanism of hypercalcemia in sarcoidosis is not well understood. Granulomas produce 1-alpha-hydroxyvitamin D, which causes elevated levels of 1,25-dihydroxyvitamin D leading to elevated serum calcium. Hypercalcemia in sarcoidosis has been reported in only 10 % of cases and rarely is it the presenting manifestation. To our knowledge this represents one of the first reported cases of severe hypercalcemia (Ca 14.1) in sarcoidosis. Only a handful of other cases have been reported with moderate elevations in serum calcium (Ca 13.5). While our patient presented with hypercalcemia, she had no other clinical clues to suggest sarcoidosis. Her ubiquitous symptoms coupled with her CT findings, namely lytic bone lesions made malignancy highest on the differential diagnosis. Key clues that separated sarcoidosis from malignancy and hyperparathyroidism included normal tumor markers, specifically a negative PTHrP and suppressed PTH levels, respectively. Widespread lytic bone lesions have been described in sarcoidosis as well. This case demonstrates that the diagnosis of sarcoidosis may be elusive, especially in patients with minor pulmonary symptoms. Internists should have a low threshold for diagnosing sarcoidosis in patients who present with hypercalcemia of unclear etiology.

A RARE CASE OF SEPTIC SHOCK ASSOCIATED WITH A PITUITARY ABSCESS Shoko Ando; Ryuichi Sada; Etsuko Fujisawa; Sandra Moody; Yoichi Kikuchi; Makito Yaegashi. Kameda Medical Center, Kamogawa, Japan. (Tracking ID #2178827)

LEARNING OBJECTIVE #1: Recognize the clinical features of pituitary abscess

CASE: An 83-year-old woman with a history of pituitary adenoma presented with a progressive headache and low-grade fever for 3 weeks and blurry vision for 1 week. Non-contrast computed tomography (CT) revealed a 22 mm thick-walled suprasellar mass. After her clinic visit, a high fever developed; she was hospitalized 2 days later. On admission, she was alert and had mild bitemporal hemianopsia. The following day, however, her consciousness deteriorated drastically with vision to light perception only. A repeat head CT revealed increased size of the suprasellar mass to 24 mm in diameter. She had acute hyponatremia with relatively low serum cortisol. Hydrocortisone 400 mg/day was initiated for secondary adrenal insufficiency. Cerebrospinal fluid revealed pleocytosis, hypoglycorrhachia, and an elevation in protein. The result of the culture was negative, but ceftriaxone and vancomycin were started empirically. Brain MRI showed a high-intensity suprasellar mass with a low-intensity rim on T2-weighted image. Gadolinium enhanced T1-weighted image showed enhancement of the rim and lower aspect of the mass as well as enhancement of the wall of the right sphenoid sinus. On

hospital day three, septic shock and acute renal failure developed, which required norepinephrine and massive fluid resuscitation. Transsphenoidal surgery was performed and yellowish pus was obtained from the pituitary gland, which led to a diagnosis of pituitary abscess. Postoperatively, she was treated with meropenem. The culture showed *Staphylococcus aureus*, *Streptococcus viridans*, *Peptostreptococcus* spp., and anaerobes. The antibiotics were changed to cefepime and metronidazole. Although incomplete bitemporal hemianopsia persisted, her vision recovered significantly. She was discharged 47 days after admission without pituitary insufficiency.

DISCUSSION: In this case, we suspected a pituitary lesion because of progressive bitemporal hemianopsia and signs of adrenal insufficiency. A pituitary abscess is an extremely rare disorder with 250 cases reported worldwide as of this report. In addition, there are few case reports of pituitary abscess with sepsis. To our knowledge, however, this is the first case report of a pituitary abscess that was associated with septic shock. Besides, this is the oldest patient ever in whom a pituitary abscess was diagnosed. In the past, the mortality rate of a pituitary abscess was 50–60 %. In contrast, recently the mortality rate has been as low as 3 %. Physicians need to be aware of this condition, since prompt and timely recognition of the disease may lead to appropriate and early medical and surgical treatment.

A RARE CAUSE OF BALDNESS Brian Dorsey¹; Darlene LeFrancis². ¹Montefiore Medical Center, New York, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2199245)

LEARNING OBJECTIVE #1: Formulate a differential diagnosis for androgen excess in women

LEARNING OBJECTIVE #2: Diagnose and Manage Ovarian Steroid Cell Tumors and Ovarian Stromal Hyperthecosis

CASE: A 56 year-old woman presented with 1 year of progressive baldness. She also noted 3 months of worsening acne across the chest and upper back as well as excessive hair growth on the face, neck, arms, chest, and back. She underwent hysterectomy at 35 years old for uterine myomas. She had a BMI of 32 with truncal obesity. Hair was thin in the central and temporal regions with the frontal hairline spared. Hair ends were tapered, and pulling the distal end did not cause removal of more than six hairs. Face, chest, back, and arms were shaven. She had scattered closed comedones on the chest. There were no areas of hyperpigmentation or striae, and no signs of virilization on gross examination. Testosterone was 392 ng/dL (5–81) and DHEA-S was 29ug/dL (35–430). FSH was 20miu/ml (21–153), LH was 22miu/ml (11–40), and Sex Hormone Binding Globulin was 27 nmol/L (17–120). Sonography revealed a 3×1×1 cm right ovary and a 3×2×3 cm left ovary with a 2×2×2 cm complex mass. Patient underwent laproscopic bilateral salpingo-oophorectomy. Pathology revealed stromal hyperplasia and hyperthecosis of the right ovary and a 2.2 cm Leydig cell tumor of the left ovary. Following the procedure, testosterone levels fell to less than 3 ng/dL, and her baldness, acne, and hirsutism improved.

DISCUSSION: Progressive baldness is disturbing for patients and is a common complaint encountered by internists. Female baldness in a frontotemporal or vertex distribution associated with acne, male-pattern hair growth, and irregular menses is suggestive of androgen excess. Polycystic Ovarian Syndrome (PCOS), adrenal and ovarian androgen secreting tumors, Cushing's Syndrome, and Ovarian Stromal Hyperthecosis are common etiologies of a hyperandrogen state. While pathology revealed two potential ovarian etiologies for androgen excess—Leydig cell tumor and Ovarian hyperthecosis, the primary driver of the patient's presentation was likely the Leydig cell tumor. Concomitant adrenal origin is unlikely as DHEA-S was not elevated. Leydig cell tumors, which belong to the steroid cell class of ovarian sex cord stromal tumors, are rare, accounting for less than 0.1 % of all ovarian tumors. The incidence of steroid cell tumors is 0.2 cases per 100,000, and Leydig cell tumors comprise only 15 % of this group. Leydig cell tumors present in the sixth or seventh decade of life with symptoms of progressive androgen excess. As the tumors are often less than 4 cm, identification by imaging is challenging. Laboratory evaluation may localize the anomaly to the ovary with elevated testosterone and normal DHEA-S. Diagnosis is made by pathology. Reinke crystals, which are rectangular crystal-like eosinophilic cytoplasmic inclusions, are characteristic and differentiate Leydig cell tumors from other steroid cell tumors. The tumor is typically benign and treatment is not often required following oophorectomy. Steroid cell tumors develop following the luteinization of stromal elements in a process similar to ovarian hyperthecosis. In fact, some members of the steroid cell tumor class are found coincident with ovarian hyperthecosis in both the ipsilateral and contralateral ovary. Ovarian hyperthecosis is a non-neoplastic cause of androgen excess marked by nests or nodules of luteinized theca cells in a proliferated ovarian stroma. Symptoms may vary from mild asymptomatic disease to virilization, which is often more severe than PCOS and may persist beyond menopause. Ovarian hyperthecosis is common, with one autopsy series identifying the process in one third of the specimens examined. The asymptomatic or mild variant predominates. Testosterone levels may be elevated (over 150 ng/dL), and

sonography may reveal enlarged ovaries. Diagnosis is established by biopsy. In the setting of androgen excess, patients with hyperthecosis are at elevated risk for insulin resistance and diabetes, which may be addressed with weight loss and Metformin. Additionally, endometrial carcinoma may be more likely in the setting of increased conversion of testosterone to estrogens. In this case, the patient had an AIC of 5.5 and was post-hysterectomy. Treatment, either with bilateral oophorectomy or GnRH agonist therapy, aims to reduce testosterone levels and thereby improve symptoms of hirsutism and virilization, reduce insulin resistance, and moderate the endometrial carcinoma risk. When addressing progressive female baldness, clinicians should recognize androgen producing tumors and consider ovarian hyperthecosis, when appropriate, as the disease process may be associated with insulin resistance, diabetes, cardiovascular disease, and endometrial carcinoma.

A RARE CAUSE OF HYPERCALCEMIC CRISIS: CHRONIC MYELOGENOUS LEUKEMIA CAN DO THAT? Meeta Desai. Penn State Hershey Medical Center, Hummelstown, PA. (Tracking ID #2196524)

LEARNING OBJECTIVE #1: Recognize an uncommon cause of malignant hypercalcemia.

LEARNING OBJECTIVE #2: Discuss the treatment of chronic myelogenous leukemia in blast crisis.

CASE: A 44-year-old female with a past medical history of chronic myelogenous leukemia (CML) presented to the emergency department after she was found unresponsive at home. Her CML was diagnosed eight years ago, and was stable on imatinib therapy with full hematologic response and partial cytogenetic response. In the emergency department, she was hemodynamically stable but unresponsive and required intubation. Physical examination was unremarkable. Laboratory studies showed calcium level of 23 mg/dL (range 8.4–10.2 mg/dL) and leukocytosis of 44 K/uL (range 4.0–10.4 K/uL). A peripheral blood smear showed 10 % blasts, suggestive of accelerated phase CML. Further workup of the hypercalcemia revealed an intact PTH level that was appropriately suppressed. Serum and urine protein electrophoresis were checked to exclude multiple myeloma and results were unremarkable. PTH-related protein (PTHrP) returned positive, which was suggestive of humoral hypercalcemia of malignancy. A subsequent CT scan of the chest, abdomen, and pelvis did not show any evidence of a mass. Given the presence of blasts on the peripheral smear, flow cytometry was done and showed myeloid blasts. A bone marrow biopsy showed 19 % blasts and FISH was positive for BCR/ABL1 fusion, consistent with a CML blast crisis. The patient was treated acutely for the hypercalcemia with intravenous fluids, zoledronic acid, furosemide, and calcitonin. Following treatment, her calcium level normalized and her encephalopathy resolved. For the CML she was started on dasatinib, an oral tyrosine kinase inhibitor. Unfortunately the patient had a complicated hospital course and ultimately died of acute respiratory failure secondary to extensive tumor burden with a high blast count.

DISCUSSION: Hypercalcemia is a frequently encountered clinical problem by general internists. The most common cause in ambulatory settings is primary hyperparathyroidism, while the most common cause in the hospital setting is malignancy. Clinicians should suspect malignancy in patients who are symptomatic and have very high serum calcium levels, typically greater than 12 mg/dL. Initial workup includes measuring PTH level, followed by PTH-rP and vitamin D metabolites. Additional imaging should be done to identify a primary source if malignancy is suspected. Hypercalcemia in malignancy can occur by one of three major mechanisms: osteolytic metastases, tumor secretion of PTHrP, and tumor production of 1,25-dihydroxyvitamin D. Common tumors that secrete PTHrP include solid tumors (e.g. breast, lung, renal, bladder) and hematologic malignancies (e.g. non-Hodgkin lymphoma). Chronic myeloid leukemia in blast phase has also been implicated, however, there have only been a few cases reported. There are two major forms of blast crisis in patients with CML: myeloid and lymphoid. Our patient had a myeloid blast crisis, which is more common (70 %). Treatment regimens depend on whether the patient developed blast crisis *de novo* or while on an oral tyrosine kinase inhibitor (TKI). For a *de novo* blast crisis, a TKI alone is used. For patients already on a TKI, AML-type induction chemotherapy in addition to a more potent TKI, such as dasatinib, is used. Despite treatment, hypercalcemia is a poor prognostic factor, as illustrated by our patient.

A RARE CAUSE OF MULTIPLE BONE LESIONS: METASTASIS OR NOT? Tatsuya Sato; Junwa Kunimatsu; Eriko Kanehisa; Junko Maeda; Mikiko Arai; Riri Watanabe; On Kato. National Center for Global Health and Medicine Hospital, Tokyo, Japan. (Tracking ID #2166077)

LEARNING OBJECTIVE #1: Recognize hyperplastic hematopoietic bone marrow as a differential diagnosis of metastatic bone tumors.

LEARNING OBJECTIVE #2: Recognize the difference between radioisotopes used in nuclear medicine imaging in order to clarify pathophysiology of multiple bone lesions.

CASE: A 59-year-old Japanese woman presented with 6 months history of tingling sensation in her toes. The patient lost balance while walking and experienced frequent fall. She had no past medical history, and reportedly drank 4 to 5 glasses of Japanese distilled spirit daily. Neurological examination revealed no remarkable muscle weakness, with strength assessed at 5 of 5 bilaterally, and decreased Achilles tendon reflexes. Sensation in her lower extremities was diminished. She showed prominent wide based gait and positive Romberg sign. Laboratory study showed mild liver abnormality and macrocytic change of the red blood cells. Brain MRI revealed multiple focal low intensity areas in the skull and vertebral bones (C3 and C4) on both T1 and T2-weighted images. Multiple, metastatic bone tumors were strongly suspected. Bone scintigraphy using technetium 99 m (99mTc) showed significant uptakes in the skull, spine, and costal bones. However, whole body CT and endoscopic examinations found no evidence of the primary site of malignancy. 18 F FDG-PET/CT indicated low-level accumulation of FDG in the vertebral bones, but it could not point out an origin of the suspected metastatic bone tumors. We conducted CT-guided biopsy of the 12th vertebra, which had the highest accumulation of FDG among the involved vertebral bones. Established tissue diagnosis was hyperplastic hematopoietic bone marrow (HHBM). Encouraging the patient to stop alcohol use led to partial recovery from neurologic symptoms, which was suggestive of alcoholic neuropathy as the cause of her complaints. One year has passed since her first visit and she is well now.

DISCUSSION: HHBM is caused by proliferation of hematopoietic cells, as a result of active response to increased peripheral oxygen demand. In general, bone marrow turns from hematopoietic marrow (red marrow) to fatty marrow (yellow marrow) with aging. However, reversion from yellow marrow to red marrow can occur under certain circumstances. These include chronic anemia, obesity, heavy smoking or drinking, long-distance running, and use of hematopoietic growth factors. HHBM mimics metastatic bone tumors on MRI images, because both the two process usually present with multiple bone lesions that are illustrated as low intensity areas on T1 and T2-weighted images. In our case, it was noteworthy that, although significant uptakes were observed in bone scintigram, 18 F FDG-PET/CT did not elucidate any focal high FDG accumulation. We speculated that this phenomenon resulted from the difference between 99mTc and 18 F-FDG. 99mTc uptake directly reflects a proliferation of hematopoietic cells that leads a high osteoplastic activity. However, the proliferation of hematopoietic cells does not bring abnormal metabolism that provokes accumulation of 18 F-FDG. This mismatch may help us to differentiate HHBM from metastatic bone tumors. In summary, this case illustrates a rare differential diagnosis for metastatic bone tumors. We should recognize the difference between 99mTc and 18 F-FDG in order to clarify pathophysiology of multiple bone lesions by nuclear medicine imaging modalities.

A RARE CAUSE OF PORTAL HYPERTENSION AND AN UPDATE OF TREATMENT STRATEGIES: SPONTANEOUS ARTERIOPORTAL FISTULA. *Katrina DeLeon; Thomas Le; Richard Hu. UCLA- Olive View Medical Center, Sylmar, CA. (Tracking ID #2194993)*

LEARNING OBJECTIVE #1: Identify a rare cause of portal hypertension.

CASE: A 58 year old Armenian male with no significant past medical, surgical, or procedural history presented with a 6 week history of mild abdominal pain and 4 week history of increasing abdominal swelling. He described eating and drinking less for fear of worsening of his abdominal swelling. He does not take any home medications. His social history includes 40 pack-year tobacco smoking and social alcohol use. His family history is noncontributory. On physical exam, vital signs are normal. Abdominal exam is significant for distension with shifting dullness and positive fluid wave with splenomegaly and audible epigastric bruit. Laboratories were unremarkable including normal complete blood count, complete metabolic panel, INR and negative viral hepatitis serologies. Ascites fluid demonstrated no evidence of spontaneous bacterial peritonitis, negative gram stain and cultures, with a total protein 1.6 g/dL, albumin 1.1 g/dL, and serum albumin of 3.7 g/dL with a SAAG of 2.6 consistent with portal hypertension. Abdominal ultrasound with doppler demonstrated an arteriovenous fistula with vascular collateralization, retrograde flow in splenic vein, no evidence of portal thrombus or cirrhosis. On CT angiogram SMA injection demonstrated no hepatic arterial supply, common hepatic arterial injection showed a vascular malformation originating from the left hepatic artery, with an extremely tortuous path into the vascular malformation and terminated in the left portal vein. He subsequently underwent embolization with multiple coils inserted in the vascular malformation arising from the hepatic artery and terminating in an aneurysmal left portal vein. From the time of initial assessment to the time of intervention, the patient required four paracenteses. At three month follow up, the patient's ascites had resolved after coil embolization with no further need for paracentesis.

DISCUSSION: In the United States, cirrhosis is the leading cause of portal hypertension. However, in the absence of cirrhosis, noncirrhotic portal hypertension comprises far fewer of the total cases in America. Worldwide, the most common etiology of noncirrhotic portal hypertension is schistosomiasis. In the Western world, chronic liver diseases including

nonalcoholic steatohepatitis, primary biliary cirrhosis, primary sclerosing cholangitis, and congenital hepatic fibrosis are the leading causes along with extrahepatic causes including portal vein thrombosis and Budd-Chiari syndrome. A rare cause of noncirrhotic portal hypertension to consider is an arterioportal fistula (APF). An APF is defined as any connection between the splanchnic arteries and the portal veins. In a review of 88 case reports, the common causes of APF were penetrating trauma (28 %), iatrogenic causes including biopsies and instrumentation (16 %), congenital causes including hereditary telangiectatic diseases like Osler-Weber-Rendu syndrome and Ehlers-Danlos syndrome (15 %), neoplasm (15 %), and aneurysms (14 %). Spontaneous APF is extremely rare. Recently, it has been proposed that APF's can be further classified into three types by etiology, size, involved vessels, and location. Type 1 includes small, peripheral, asymptomatic APF with minimal physiologic insult, type 2 includes larger, central fistulas causing physiologic insult, and type 3 including congenital fistulas. Small APF's are usually found incidentally and are asymptomatic, however large APF's are usually symptomatic with the most common presenting symptoms of gastrointestinal bleed (33 %), ascites (26 %), heart failure (4.5 %), and diarrhea (4.5 %). A Bruit or thrill can also be appreciated in approximately 33 % of patients and is most likely present when the fistulas are greater than 4 mm. Spontaneous APF in an adult with no history of prior trauma, instrumentation, or liver disease, is an extremely rare condition with the historical treatment being surgical ligation of the artery supplying the APF or resection of the vascular anomaly. Because of the morbidity and mortality associated with surgical intervention and the development of non-invasive endovascular interventions, embolization has progressively become the first line treatment. Embolization with coils, balloons, and n-butyl cyanoacrylate (NBCA) have all been demonstrated as potential therapies. Should the patient continue be symptomatic with ascites or gastrointestinal bleeding, surgical treatment is then pursued. In rare cases with continued complications, liver transplantation may be necessary as the ultimate therapeutic option. In our case of spontaneous APF without prior trauma, instrumentation, or liver disease, a large, symptomatic, APF was treated successfully with coil embolization. This further suggests that non-surgical treatment through interventional radiology is a safe and practical management option although there is no large clinical study available.

A RARE DISEASE (MULTICENTRIC CASTLEMAN'S DISEASE) IN AN IMMUNOCOMPROMISED PATIENT. *Mazyar Malakouti; Jessica B. Polasek. University of Texas Health Science center in San Antonio, Texas, San Antonio, TX. (Tracking ID #2200763)*

LEARNING OBJECTIVE #1: Recognize the clinical features and treatment of multicentric castleman's disease (MCD)

LEARNING OBJECTIVE #2: Recognize the vast differential diagnosis in immunocompromised patients and the relationship between MCD and HHV 8

CASE: A 21-year-old Hispanic male with no past medical history presented to our hospital with worsening abdominal pain for approximately 2 months. He described the pain as intermittent initially, but not associated with eating food. Due to the abdominal pain, associated nausea and vomiting, he had lost approximately 15 lb. He denied any hematochezia, melena, dysphagia or hematemesis. In addition, he also complained of diffuse maculo-papular rash involving the palms and soles. He also had noted that his lower extremities were more swollen than usual. The patient had normal vital signs. His exam was significant for a semi protuberant abdomen, with some mild tenderness to deep palpations in the right and left upper quadrants without guarding or rebound tenderness. A diffuse non-itchy maculo-papular rash, was also noted on his torso and extremities, including his palms and soles. His exam also revealed a 2.6 cm right inguinal slightly tender lymph node in addition to some minimal submandibular lymph nodes. He had two distinct anal warts measuring about 0.5 cm in diameter. His labs were normal except for a normocytic anemia and a positive HIV and RPR. His chest x-ray showed a large right pleural effusion. CT scan of the abdomen and pelvis showed diffuse lymphadenopathy with moderate ascites. A paracentesis performed was consistent with an exudative process and revealed a normal cell count and negative gram stains. The patient was immediately started on highly active antiretroviral therapy (HAART) for his recent diagnosis of AIDs and benzathine penicillin for his underlying syphilis. Two weeks after the treatment was initiated, his rash dramatically improved but his abdominal pain and lymphadenopathy remained present. A biopsy of the inguinal lymph node was subsequently performed with an initial read of Kaposi sarcoma associated with Human herpes virus (HHV) 8. A final read was amended to include multicentric Castleman's disease (MCD). Due to his extensive disease process, rituximab was later added to his therapy. Two doses later, the patient developed multi-organ failure from possible rapid progression of his disease or perhaps due to immune reconstitution syndrome (IRS) and subsequently died a few weeks later.

DISCUSSION: Castleman's disease is a lympho-proliferative disorder also known as angiofollicular lymph node hyperplasia. This disease remains rare and the real incidence is currently unknown. Histologically, Castleman's disease can be classified as either hyaline-

vascular or plasma cell variant with some cases demonstrating mixed features. In HIV associated MCD, all patient are co-infected with HHV-8 and hence malignancies such as Kaposi sarcoma and primary effusion lymphoma; that also share this common pathogen (HHV-8) are frequently encountered. The natural history of MCD is variable but can be fatal in patient with concomitant HIV 2. Usually patient will present with a plethora of symptoms including, fevers, peripheral lymphadenopathy, hepatosplenomegaly, weight loss and edema. Ascites, pleural and pericardial effusion have also been reported. The diagnosis is made via excisional biopsy of an affected lymph node usually showing angiofollicular hyperplasia and interfollicular plasma cell infiltration. Core needle biopsy is preferred to a fine needle aspiration. The treatment of MCD remains controversial and based on a few studies and some case reports. HAART is key in patients with HIV although this does not alleviate symptoms associated with Castleman's disease. Interestingly, initiation of HAART can cause rapid progression of the disease perhaps due to immune reconstitution inflammatory syndrome (IRIS). Glucocorticoids offer short term symptoms management by controlling the inflammatory response, but effects have not been studied in HIV patient with MCD. Multiple chemotherapeutic agents have been used as single agents or in combinations but the data remains limited and non-conclusive. However, the use of rituximab, an anti-CD 20 monoclonal antibody, has shown promising results. Of note, rituximab can often cause a flare up of Kaposi sarcoma in patients with HIV. Anti-herpes virus therapies have also been explored but the studies remain small and the data inconclusive. Patients with AIDs continue to present with wide array of symptoms and opportunistic diseases. This case shed light on a rare lymphoproliferative disorder, multicentric Castleman's disease (MCD), which is often found in patients with HIV. This case also reflects on the challenges that many providers face while taking care of patients with AIDs and HIV.

A RARE DRUG ERUPTION IN A PATIENT WITH AN UNUSUAL MENINGITIS
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LEARNING OBJECTIVE #1: Recognizing rare adverse cutaneous reactions and understanding the importance of recognition that allows for prompt discontinuation of the offending agent, reducing the morbidity that is associated with such drug reactions.

LEARNING OBJECTIVE #2: Recognizing the importance of early detection and diagnosis of acute bacterial meningitis, particularly in the setting of rare organisms such as *Streptococcus salivarius*.

CASE: A 56-year-old woman with no significant past medical history presented to our emergency department with a chief complaint of headache for 5 days. A week prior to admission, the patient had sought medical attention at an outside emergency department for similar symptoms and was subsequently discharged without intervention. At presentation, the patient complained of severe headache, fever and associated nausea, vomiting, and photophobia. Concerned for meningitis, the patient was admitted to the teaching service. Appropriate laboratory studies were performed including a lumbar puncture, which demonstrated findings consistent with acute bacterial meningitis. Broad-spectrum antibiotics were initiated pending cultures and sensitivities. On hospital day 2, CSF cultures grew *Streptococcus salivarius*. Antibiotics were tailored appropriately based on sensitivity studies. By hospital day 4 the patient had defervesced and improved symptomatically. However, on hospital day 7, the patient was acutely febrile again, with significant leukocytosis and an acute rise in serum creatinine. She complained of severe burning and itching of her face, trunk and extremities. Repeat cultures were negative. Overnight, the patient suddenly developed an acute eruption of widespread non-follicular pustules, 1–2 mm in size and diffusely widespread, overlying areas of generalized erythematous edema. On oral examination, limited involvement of the left buccal mucosa was also seen. A diagnosis of acute generalized exanthematous pustulosis (AGEP) was presumed. A gram stain and culture was performed on the pustules, which demonstrated no bacteria but many neutrophils. A punch biopsy of the abdominal skin demonstrated subcorneal neutrophilic inflammation with spongiform pustules, with the subjacent dermis displaying mild perivascular lymphocytic inflammation, consistent with the diagnosis of AGEP. Over the next few days the patient's pustulosis regressed and was followed by widespread superficial desquamation. She defervesced again and her symptoms of burning and itching subsided. Extensive work-up for the underlying etiology of her *Streptococcus salivarius* meningitis returned inconclusive. By hospital day 12 the patient had completed her appropriate course of antibiotic therapy and was deemed appropriate for discharge with follow-up. Renal function slowly improved in the coming weeks.

DISCUSSION: Acute generalized exanthematous pustulosis (AGEP) is a rare acute cutaneous reaction that is characterized by an eruption of small, superficial, nonfollicular sterile pustules usually 1–2 mm in size that overlie areas of edematous erythema. It has an annual incidence of approximately one to five cases per million. Though AGEP can occur at any age, the average age of onset is 56 years, and women are affected more often than men.

Nearly 90 % of the cases of AGEP are due to drugs, particularly antibiotics. The most commonly implicated antibiotics are beta-lactams, particularly penicillins, and macrolide classes. The spectrum of drugs implicated in AGEP are different than those usually responsible for other skin reactions such as Stevens-Johnson syndrome/toxic epidermal necrolysis. AGEP has also been seen following mercury ingestion or certain viral infections such as Cytomegalovirus, Parvovirus B19, Coxsackievirus, and Mycoplasma pneumoniae. Classically, the cutaneous eruption in AGEP begins within 1 to 2 weeks of starting the offending agent and starts as generalized edematous erythema, which acutely disseminates into widespread small, sterile nonfollicular pustules within a few hours to a few days, followed by brisk desquamation. The rash is characteristically accompanied by fever, leukocytosis, pruritis and burning. Mucous membrane involvement occurs in approximately 20–30 % of patients and is generally mild and limited to the mouth and tongue. Histopathologically, the most relevant features on biopsy are patterns of non-follicular subcorneal and/or intracorneal spongiform pustules that coalesce, with a neutrophilic inflammatory dermal infiltrate. After elimination of the causative drug, pustules spontaneously disappear within a few days with desquamation and the reaction resolves in approximately 2 weeks. Internal organs are not usually involved and no systemic treatment is required. Withdrawal of the culprit drug is mandatory for resolution. Although AGEP itself is a self-limiting disease with a good prognosis, secondary infections are not uncommon complications, particularly in patients with multiple medical co-morbidities. The reported mortality is approximately 3–5 %.

A RARE ISOLATE: DAPTOMYCIN NONSUSCEPTIBLE VANCOMYCIN RESISTANT ENTEROCOCCUS FAECIUM CAUSING ENDOCARDITIS Neal George; Joshan Suri. Conemaugh Memorial Medical Center, Johnstown, PA. (Tracking ID #2198721)

LEARNING OBJECTIVE #1: Diagnosing Daptomycin nonsusceptible vancomycin resistant enterococcus faecium.

LEARNING OBJECTIVE #2: Identify risk factors for the development daptomycin nonsusceptible vancomycin resistant enterococcus.

CASE: A 76-year-old male with history of coronary artery disease and chronic kidney disease stage IIIB developed abdominal pain for 7 days prior to presenting to the emergency room. The patient was afebrile with laboratory studies significant for a WBC of 13.6 thousand/cumm, troponin of 0.04 ng/m, and GFR of 49 mL/min, which was similar to the patient's baseline renal function. Computed tomography of the abdomen and pelvis with contrast revealed a colon mass in proximal transverse colon near the area of the hepatic flexure. Blood cultures drawn 12 h apart revealed vancomycin resistant enterococcus (VRE) faecium. This particular isolate had a non-susceptibility Etest to daptomycin with a mean inhibitory concentration (MIC) of 12 µg/mL, with sensitivity to linezolid. Colonoscopy revealed an ulcerated non-obstructing large mass in the proximal transverse colon which was biopsied. Pathology was negative for any malignancy but revealed acute necro-inflammatory debris and lamina propria hemorrhage. Transesophageal echocardiogram (TEE) revealed small vegetations on the anterior mitral valve leaflet. The patient was treated successfully with intravenous linezolid and gentamicin for a total of 8 weeks with repeat TEE showing resolution of the previously seen vegetation.

DISCUSSION: The first case of VRE endocarditis that met the Duke Criteria was reported in 1996. Native valve endocarditis secondary to enterococci account for 14–17 % of cases among patients over the age of 60. Enterococci are considered to be susceptible if the MIC is less than 4 µg/mL and have intermediate resistance once the MIC are between 8 and 16 µg/mL. VRE colonization has been shown to have a higher incidence amongst renal transplant and hemodialysis patients. There are limited case reports of enterococci faecium causing endocarditis. We report a rare case of daptomycin nonsusceptible vancomycin resistant enterococcus faecium (DNS-VRE) causing endocarditis in a patient with an underlying benign colon mass. It was believed that the source of the isolate was the ulcerated colon mass. The reported patient fulfilled the modified Duke Criteria for endocarditis with 2 major criteria (ie positive blood cultures for enterococci and mitral valve vegetation). DNS-VRE is an extremely rare isolate, however several risk factors for DNS-VRE isolation have been suggested via retrospective analysis including immunosuppression, duration of hospitalization, indwelling devices thought to foster biofilm formation on prosthetic devices, and previous daptomycin exposure. Pfaller MA et al. 2005 found only 0.6 % (10/1560) of isolates among VRE species were DNS-VRE. At the present time, little is known about the emergence or the incidence of DNS isolates. Kelesidis T et al. 2011 report that less than 2 % of enterococci isolates were daptomycin nonsusceptible with MIC of ≥4 µg/mL. The rising reports of DNS-VRE is concerning. We report a case in which the MIC was found to be 12 µg/mL suggesting that this isolate was truly DNS-VRE. Daptomycin is the only antibiotic with in vitro bactericidal activity against VRE that has been approved by the Food and Drug Administration. Based on susceptibility breakpoints approved by the Clinical Laboratory Standards Institute, daptomycin has in vitro activity against >90 % of enterococcal isolates. Dohmen PM et al. 2012 outlines daptomycin for the treatment of infective endocarditis through one of the largest trials involving infective endocarditis and suggests that ≥8 mg/kg dosing of daptomycin has a higher clinical success

rate (90 %) compared to standard dosing (4 mg/kg). At the current time there exists no recommendations from the Infectious Disease Society of America regarding treatment for DNS-VRE infections. Further studies are needed to clarify the mechanism of development of resistance among patients with VRE, and what dose of daptomycin would most be effective in patients found to have DNS-VRE infections.

A RARE YET EMERGING CAUSE OF SEVERE MYOCARDITIS AND CARDIOMYOPATHY Sweny Gulati; Aymara Chang; Amy Vittor; John Petersen; Margaret C. Lo. University of Florida College of Medicine, Gainesville, FL. (Tracking ID #2198964)

LEARNING OBJECTIVE #1: Recognize typical and atypical clinical manifestations of chikungunya infection

LEARNING OBJECTIVE #2: Identify risk factors and poor prognostic indicators for atypical, severe chikungunya infection

CASE: A 40 year-old male presented as a hospital transfer for severe cardiomyopathy after 7-days of high fevers (101.9 °F), cough, sore throat, arthralgias, chest pain, and diarrhea. He required vasopressor support for hypotension. Medical history includes tobacco abuse and herniated lumbar disc but no hypertension, diabetes, or cardiopulmonary diseases. Social history noted recent immigration from Puerto Rico 2 weeks ago, multiple mosquito bites back in Puerto Rico, and girlfriend with recent chikungunya infection in Puerto Rico. Outside lab values revealed leukocytosis (12700/ μ L), thrombocytopenia (85000/ μ L), renal dysfunction (creatinine 1.21 mg/dL), and transaminitis (ALT 206 IU/L, AST 52 IU/L). EKG showed sinus tachycardia with T-wave inversions in V4-V6. Initial troponin-T level was 0.34 ng/mL and peaked to 2.63 ng/mL. Initial BNP value was 236 pg/mL but increased to 1864 pg/mL in 24 h. A transthoracic echocardiogram (TTE) showed severe left ventricular systolic dysfunction, ejection fraction (LVEF) of 25 %. Due to concerns of NSTEMI, the patient was started on heparin drip and transferred to our cardiac care unit for advanced heart failure therapies. Upon transfer, physical exam was remarkable only for diffuse abdominal tenderness. Repeat Troponin-T level was 0.26 ng/mL with normal CK and CK-MB. NT-proBNP level was 37329 pg/mL. CRP level was high at 328 mg/L. TTE again showed low LVEF of 15 %, diffuse hypokinesis and moderate right ventricular systolic dysfunction. Heparin drip was discontinued as troponinemia were felt to be from chikungunya-induced myocarditis. Infectious Disease agreed; chikungunya and dengue serologies were sent. The patient slowly improved with supportive care and was discharged with close outpatient Cardiology follow up. Two weeks later, the diagnosis of chikungunya was confirmed with positive IgM titer of 1:640 and IgG titer of 1:1280. Dengue IgG titer was positive at 14.6 (range<1.64) but IgM titer negative at 1.08 (range<1.64), consistent with prior dengue virus infection.

DISCUSSION: This case illustrates the growing footprint of global medicine in the U.S. and the increasing need for global health training among U.S. clinicians, particularly on emerging infections. Similar to the West Nile and dengue viruses, chikungunya virus (CHIKV) is a mosquito-borne illness endemic to tropical regions. With air travel and rapid spread of *Aedes spp* mosquitoes into Europe and Latin America, case reports are now surfacing in the U.S., all transmitted autochthonously. Typical CHIKV illness presents as high fevers and debilitating polyarthralgias with associated prostration, headaches, backache, rash, and diarrhea. The arthralgia and fatigue can persist for months to even years. Key diagnostic clues include those with acute symptoms unexplained by other medical illnesses and recent travel or residence in endemic or epidemic areas, as true in our patient. Of importance also is the social history in our case of recent mosquito bites and girlfriend with CHIKV infection. Rarely in 0.3 %, CHIKV infections progress to atypical, severe symptoms other than fevers and arthralgias, requiring maintenance of ≥ 1 vital organ. Such severe manifestations include cardiovascular disorders (myocarditis, arrhythmias, heart failure, cardiogenic shock), pre-renal failure, respiratory failure, and neurological disorders (meningoencephalitis, seizures). Hemorrhagic complications are rare, which is a key distinction from dengue fever. Literature cites atypical CHIKV infections occurring commonly (90 %) in those with chronic medical conditions, i.e. hypertension, diabetes, cardiovascular disease, and COPD. Advanced age, i.e. ≥ 60 years-old, has been cited as a significant risk factor for not only atypical, severe infections but also increased mortality. Other poor prognostic indicators include hypertension, underlying respiratory disease, recent NSAID use prior to admission, and pre-existing cardiac disorders. However, the immunocompetent state of our patient should not mislead clinicians. Literature has reported severe CHIKV infections affecting the cardiovascular and neurological systems in healthy young patients. Early recognition of myocarditis and cardiomyopathy as a rare manifestation of CHIKV infection may not alter prognosis but will prevent extensive and costly testing. Lab confirmation of CHIKV infection via virus isolation, viral RNA detection, or detection of IgM antibodies is needed to exclude similar illnesses that may warrant different treatments (e.g. influenza, dengue). Identifying individuals with risk factors and poor prognostic indicators of atypical CHIKV infection is important to expedite inpatient supportive management. Neither effective antiviral treatment nor vaccines are available, though multiple vaccine candidates are under development.

A REAL PAIN IN THE NECK: A BOXER'S BOUT WITH LEMMIRE'S SYNDROME. Ankeet Bhatt²; Shaina Lynch¹. ¹University of Connecticut, Farmington, CT; ²University of Connecticut School of Medicine, Farmington, CT. (Tracking ID #2194066)

LEARNING OBJECTIVE #1: Recognize Lemierre's syndrome as a rare cause of an otherwise healthy person presenting with neck mass and throat pain.

LEARNING OBJECTIVE #2: Understand the clinical consequences of Lemierre's syndrome and the role of oral flora in the disease state.

CASE: HPI: Twenty-one year old college student and competitive boxer with no significant PMH presents with 5 day history of sore throat and headache. Symptoms began with a mild sore throat and 7/10 bi-frontal and right sided pain. The patient initially saw his PCP, rapid strep test and Monospot were negative. The patient had body aches, chills, low grade fevers (99.4–100.6), nausea, and one episode of NBNB emesis. The patient was again brought to his PCP, and CXR was normal. The patient's throat pain worsened, with odynophagia and increasing swelling on the right side, associated with shortness of breath and cough productive of white sputum. A CT chest showed a process consistent with viral/atypical pneumonia. With worsening right sided throat pain and 102.7 fever, the patient was seen in the hospital. CT neck revealed density suspicious for thrombus in the right internal jugular vein, consistent with diagnosis of Lemierre's syndrome. The patient was placed on Ampicillin/sulbactam 3 g Q6hr and azithromycin 250 mg daily, and transferred to a tertiary care facility for further management. The patient's mother did mention he infrequently cleaned his mouthguard for boxing, and would often chew on it, suspected to be a nidus for the infection. Neck CT from OSH was reviewed by radiology confirming thrombus in the right IJV. Blood cultures grew anaerobic Gram negative rods, consistent with *Fusobacterium*. The patient was maintained on Ampicillin/sulbactam and began to improve clinically. Repeat CT showed new interval opacities in the upper lobes bilaterally, consistent with septic emboli. ROS negative for any altered mental status, recent travel, or hemoptysis. PICC line was placed and the patient continued to improve clinically. The patient was discharged with PICC line in place and support services to continue IV antibiotics with anaerobic coverage for a total of 4 weeks. Past Medical, surgical and family history all noncontributory. Up-to-date on all vaccinations. **Allergies:** NKDA **SH:** Exercise physiology student; competitive boxer. Social drinker. Denies smoking or recreational drug use. **PE:** Vitals on admission: Temp 101.5, HR 122, BP 110/74, non-orthostatic, RR 40, O2 sat 97 % on 3 L NC. General: lying in bed, uncomfortable, diaphoretic. HEENT: Decreased neck ROM to right side. + 1cmx2cm tender mass in the right anterior neck. + tender LAD in the right posterior cervical chain. Respiratory: + tachypnea, + nasal flaring, unable to complete a full sentence in one breath. Lungs clear Heart: Tachycardia. Regular rhythm. S1, S2 heard. Neuro: No focal deficits. **Diagnostic Data:** CBC/BMP on admission—WBC 10.2, Hb 13.2, hct 38.4, plt count 79,000. Na 141, K 3.8, Cl 107, HCO3 27, BUN 16, Cr 1.4 (BL unknown), glucose 110. EKG: Sinus tachycardia, rate 118 bpm. Micro: + anaerobic Gram negative rods 4/4 bottles. CT Chest: Small peripheral consolidation in the apices bilaterally, consistent with septic emboli.

DISCUSSION: Lemierre's syndrome is described as a septic thrombophlebitis of the internal jugular vein, caused by the migration of bacterial through the deep tissues of the neck to the lateral pharyngeal space, near the vein. In 80 % of cases, the offending bacteria is *Fusobacterium necrophorum*, an anaerobic gram negative rod, quoted in multiple studies to be responsible to 10 % of acute sore throats and 23 % of peritonsillar abscesses. According to a systemic review of Lemierre's syndrome in 2009, sore throat is the first presentation sign in one third of all cases, followed by neck mass (23 %) and neck pain (20 %). Pooled mortality rates are about 5 %, and the disease usually affects previously healthy young people, as our patient was. From a physiological standpoint, the symptoms of SIRS/sepsis are caused by induction of a cytokine response by lipopolysaccharide endotoxin produced by the bacteria. *Fusobacterium necrophorum* produces *hemagglutinin*, which causes platelet aggregation that leads to thrombophlebitis or DIC. As seen in this case, the thrombophlebitis can spread distantly, most commonly affecting the pulmonary capillaries and leading to pulmonary septic emboli. Other sites include large joint spaces, such as the knee or hip. The mainstay of treatment for the condition in antibiotics, but increasing beta-lactamase resistance has been shown, and therefore beta-lactamase resistant antibiotics with anaerobic coverage are recommended. Perhaps the increasing incidence of the disease is secondary to the movement to avoid antibiotics in the treatment of typical upper respiratory infections. The role of anticoagulation in Lemierre's syndrome remains controversial, with the low incidence of the disease preventing adequate sized control studies to study the question.

A SHEEP IN WOLF'S DISGUISE: THORACIC ACTINOMYCOSIS MASQUERADING AS LUNG CANCER Ming Zhao; Charu Ramchandani; Maher Jafar; Manuel Matos. Rochester Regional Health System, Rochester, NY. (Tracking ID #2192261)

LEARNING OBJECTIVE #1: Recognize the common presentations of actinomycosis

LEARNING OBJECTIVE #2: Distinguishing thoracic actinomycosis from pulmonary malignancy

CASE: Patient is a 52 year old male, who hasn't seen a primary care physician for more than 30 years, was admitted to our hospital due to 2 weeks of dry cough, night sweats, mild chest pain, worsening weakness and more than 30 lb weight loss over 2 months. Patient denies any fever or shortness of breath. Patient denies any significant medical history in the past. No history of tuberculosis or exposure. His social history was remarkable for significant second-hand tobacco exposure and weekly marijuana use. On examination, his vital signs were within the normal range. No lymphadenopathy. Lungs were clear to auscultation bilaterally. Breathing was non-labored. His labs were remarkable for WBC of 12.0 and hemoglobin of 11.6 g/dl. Chest X-ray on admission showed extensive right paratracheal density that was concerning for mass. Chest CT showed large mass in the right upper lobe abutting the right side of the mediastinum measuring up to 5.2 cm, highly suspicious for neoplasm, as well as adjacent ground glass opacities and mild mediastinal and right hilar adenopathy. Given his dry cough, significant rapid weight loss and radiological appearance of lung mass, lung cancer was highly suspected and patient underwent a CT guided biopsy of the mass. While waiting for the pathology result, oncology was consulted, who recommended CT head, CT abdomen/pelvis and nuclear bone scan for metastasis work up as inpatient, due to the patient's lack of primary care physician and difficulty of outpatient follow up. All these imaging came back negative for any metastatic disease. Later, the pathology report came back showing lung parenchyma with areas of necrotizing inflammation, no evidence of malignancy, and stains revealed microorganisms located in the necrotic tissue appear to form thin hyphae-like formations with a beaded appearance. Gram stain highlighted gram positive bacteria, concerning for actinomyces. Upon further questioning, patient recalled a recent history of "bad molar", for which he did not seek any medical attention. Oral exam showed poor oral hygiene, a severe dental caries and surrounding gingivitis. Patient was diagnosed as thoracic actinomycosis and treated with 6 months of antibiotics. Repeat CT scan after treatment showed significant improvement. And the patient's symptoms also resolved.

DISCUSSION: Actinomycosis is a chronic bacterial infection caused by Actinomyces species. Actinomyces are gram-positive anaerobic bacteria that are part of the normal mucosal flora of the oral, gastrointestinal, respiratory, and genital tracts and can cause infection in these systems if the mucosal integrity is compromised. Most of the actinomycosis present as oral-cervicofacial infection. About 15–20 % of actinomycosis involves the thorax, most likely resulted from aspiration of the organism from either the oropharyngeal cavity or gastrointestinal tract. Common signs and symptoms of thoracic actinomycosis include fever, weight loss, cachexia, weakness, chest pain, shortness of breath and cough potentially accompanied by hemoptysis. Masses with pleural involvement are common radiologic findings and may be easily confused with malignancies. The diagnosis of thoracic actinomycosis is always challenging because it is a rare disease, symptoms are non-specific and can mimic a lot of other pulmonary pathologies. It has been described as "the most misdiagnosed disease" and "so often missed by experienced clinicians." The biggest challenge is to have an awareness of the disease presentations and consider the possibility that actinomycosis is present. Thus a comprehensive history and physical exam is always very important. Risk factors such as aspiration, history of dental procedure and poor oral hygiene during oral exam should always raise the suspicions of actinomycosis. However, given the non-specific presentation of thoracic actinomycosis, appropriate microbiologic and pathologic studies are still essential for definitive diagnosis. CT guided biopsy or bronchoscopy can be used to obtain a specimen. A high index of suspicion should be communicated to the microbiology laboratory, along with material from biopsy specimens. The presence of non-acid-fast, gram-positive organisms with filamentous branching is suggestive of the diagnosis. Penicillin G is the drug of choice for treatment of any infection caused by Actinomyces. Alternative antibiotics include tetracycline, erythromycin, cephalexin, oxacillin and clindamycin. Course of therapy should be individualized depends on the initial burden of disease and the clinical and radiologic response. Surgical removal of infected tissue may also be necessary in some cases, if burden of disease is extensive, poor response to antibiotics or malignant disease cannot be excluded.

A SHOCKING CAUSE IN A CASE OF CARDIOGENIC SHOCK. Kavel Visrodia. Mayo Clinic Rochester, Rochester, MN. (Tracking ID #2198116)

LEARNING OBJECTIVE #1: Recognize pericardial effusion as a potential manifestation of primary adrenal insufficiency.

LEARNING OBJECTIVE #2: Question adrenal insufficiency in patients presenting to the clinic with chronic fatigue.

CASE: A 20-year-old woman presented to the emergency room with 3 days of nausea and epigastric pain. Her medical history was remarkable for Hashimoto's thyroiditis requiring levothyroxine replacement, anxiety and depression. For the last 2 years she had been experiencing unexplained debilitating fatigue and weakness rendering her unable to attend school and work. Her vitals were remarkable for blood pressure 77/26, heart rate 119, respiratory rate 30, and oxygen saturation 94 % on 2 L nasal cannula. On physical exam she was notably mentating well, but ill-appearing with dry, warm skin, and a nontender

abdomen. Labs revealed hemoglobin 11.1, leukocytes 13.3, sodium 129, potassium 4.5, creatinine 1.7, bicarbonate 19, lactate 2.8, and thyroid stimulating hormone 5.8. Electrocardiogram revealed diffuse ST and T wave abnormalities and chest x-ray was unremarkable. After failure to respond to 5 L of rapid fluid resuscitation over 90 min (blood pressure 75/39, heart rate 122), pressor support was initiated and she was transferred to the medical intensive care unit. Bedside ultrasound revealed a moderately sized circumferential pericardial effusion with hepatic venous flow consistent with tamponade physiology. Urgent pericardiocentesis led to aspiration of 175 cc of serous fluid with only transient improvement in hypotension so stress-dosed steroids were initiated for possible underlying adrenal insufficiency. Over the next 2 days she was gradually weaned from pressor support with resolution of her symptoms, labs and ECG abnormalities, and therefore was transferred to the medical floor for continued care. Pericardial fluid gram stain and bacterial cultures were negative, as were PCR tests for *M. tuberculosis* and *M. pneumoniae*. Cytology revealed reactive mesothelial cells consistent with an inflammatory process. An exhaustive rheumatologic workup returned negative. A cortisol level was added to blood work obtained on presentation and returned undetectable. Adrenocorticotrophic hormone and 21-hydroxylase antibody levels were markedly elevated at 4055 and 54, confirming primary adrenal insufficiency due to autoimmune adrenalitis. She was evaluated by Endocrinology and transitioned to oral hydrocortisone before discharge with outpatient follow-up.

DISCUSSION: We present a case of a young woman admitted for pericardial effusion and cardiogenic shock potentially secondary to primary adrenal insufficiency. Although up to nearly one half of pericardial effusions have been described as idiopathic, previously published case reports have also described effusions secondary to primary adrenal insufficiency. While it is impossible to know in our case, a workup for adrenal insufficiency should perhaps be considered in the setting of pericardial effusion after a negative exhaustive workup. More importantly, we had low threshold to initiate stress-dosed steroids for possible adrenal crises when her hemodynamic instability only transiently improved following pericardiocentesis. Failure to recognize early adrenal crises and promptly initiate steroids contributes to the high mortality that is associated with this disease. In a young woman with existing autoimmune thyroid disease and presenting with shock and no evidence of infection, primary adrenal insufficiency should be high in the differential. Not uncommonly, autoimmune thyroid and adrenal disease coexist and is recognized as type II polyglandular autoimmune syndrome. Earlier detection of adrenal insufficiency in the outpatient setting may have prevented crises as our patient had 2 years of preceding unexplained fatigue. Delayed recognition of adrenal insufficiency is well recognized as half of patients have been reported to have symptoms longer than 1 year and two-thirds will have sought evaluation by three or more providers before a correct diagnosis. Primary care providers often have the first opportunity to diagnose adrenal insufficiency and not only drastically improve a patients quality of life, but prevent life-threatening adrenal crises.

A STROKE OF POLYCYTHEMIA VERA Jordan D. Becerril; Rachel Oreck; Nina Thomas. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198740)

LEARNING OBJECTIVE #1: Assess, diagnose, and treat a patient suspected to have polycythemia vera (PV)

LEARNING OBJECTIVE #2: Recognize risk factors for thrombotic events in patients with PV

CASE: A 72 year-old man with history of chronic obstructive pulmonary disease (COPD) presented with focal neurologic deficits including worsening dysarthria, right upper extremity paresthesia, and facial droop for three days. On presentation, neurology was consulted for stroke activation. Head imaging was negative for an acute intracranial event but positive for remote ischemic events as well as diffuse atherosclerotic disease. The patient had partial resolution of his neurological symptoms and was placed on aspirin and rosuvastatin by the primary neurology service. Internal medicine was consulted regarding his reported history of positive purified protein derivative and incidental finding of elevated hemoglobin. Social history was significant for a 50 pack-year history of smoking though he did not have any chronic occupational exposures to carbon monoxide. On physical exam the patient was noted to be hypertensive at 177/95, oxygen saturation was 95 % on room air, and he demonstrated plethoric facies with right-sided facial droop. Complete blood count (CBC) was noted to have a white blood cell count of 17,000/ μ L, hemoglobin count of 20 g/dL, hematocrit of 63 %, platelets of 437,000/ μ L, confirmed with repeat studies. Erythropoietin (EPO) level was found to be low at 2.2 mIU/mL and Janus Associated Kinase (JAK) 2 mutation was positive, meeting diagnostic criteria for polycythemia vera. Chest x-ray and T-SPOT.TB were negative for active or latent tuberculosis infection. The patient was phlebotomized a total of 1.5 L over five days with a reduction of hematocrit to 51.5 %. He was discharged on hydroxyurea 500 mg daily and was scheduled for follow up with hematology, weekly assessment of hemoglobin/hematocrit, phlebotomy as needed with goal hematocrit less than 45 %, and bone marrow biopsy.

DISCUSSION: Polycythemia vera (PV) is a chronic myeloproliferative neoplasm characterized by clonal growth of an aberrant hematopoietic progenitor cell. Common presenting features include nonspecific complaints such as headache and weakness, pruritus, thrombosis, transient visual disturbances, and gastrointestinal symptoms. Often patients have no complaints and are only diagnosed after an incidental finding of elevated hemoglobin on CBC. It is important to exclude other causes of elevated hemoglobin. Physical exam findings include splenomegaly, plethoric facies, and hepatomegaly. Patients with PV have high rates of cardiovascular (CV) events and are also at risk for transformation to myelofibrosis and acute leukemia. In a large cohort study the cumulative rate of CV events was found to be 5.5 events per 100 persons per year, 25 % of which were cerebrovascular-related. Risk factors for thrombotic events include age >65 years and prior history of thrombosis. Diagnosis of PV per the World Health Organization PV Criteria requires two major criteria and one minor criterion or the first major with two minor. Major criteria include a hemoglobin count of greater than 18.5 g/dL in men, 16.5 g/dL in women and the presence of JAK2 mutation. Minor criteria include serum EPO level below normal reference range, bone marrow biopsy showing hypercellularity for age, and endogenous erythroid colony formation in vitro from the aspirate. The primary goal of treatment is to reduce the risk of thrombosis. Phlebotomy remains the mainstay of treatment with a goal hematocrit less than 45 %. Other treatment modalities include low dose aspirin, hydroxyurea, and/or interferon alpha therapy. In addition ruxolitinib, a JAK 1 and 2 inhibitor, was recently named the first FDA-approved drug for PV.

A SURREPTITIOUS DIAGNOSIS: HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS Joyce Alencherril; Maisha Barnes; Leigh Hunter; Asma Khatoun. Methodist Dallas Medical Center, Dallas, TX. (Tracking ID #2158620)

LEARNING OBJECTIVE #1: Hemophagocytic lymphohistiocytosis (HLH) is a disorder of immune dysregulation that can lead to multiorgan failure. A high level of suspicion and prompt diagnosis are essential so that life-saving treatment is not delayed.

CASE: A 63-year-old man presented with a 9-month history of intermittent weakness, progressive fatigue, and abnormal hepatic function punctuated by four hospitalizations. The first presentation occurred after 6 weeks of fatigue, intermittent fever and chills, anorexia, 20-lb weight loss, and jaundice. He was noted to have elevated liver function tests (LFTs) and a liver biopsy was performed and consistent with cholangiopathy thought to be drug-induced secondary to herbal supplements. The patient was told to abstain from these supplements and was prescribed ursodeoxycholic acid and prednisone, with improvement of his symptoms and LFTs. The patient's second hospital admission came after a syncopal episode thought to be due to volume depletion and adrenal insufficiency caused by rapid tapering of the patient's prednisone. Pancytopenia was also noted and bone marrow biopsy was performed which was normal. The patient's LFTs were elevated again and his dose of prednisone was increased. The patient's third hospitalization occurred after outpatient blood work indicated thrombocytopenia. The patient underwent another bone marrow biopsy that was again normal, so he was treated with intravenous immunoglobulin and steroids for presumed idiopathic thrombocytopenic purpura. The patient had another liver biopsy which was concerning for HLH, but he had no other diagnostic criteria at the time. The patient's fourth hospital admission was prompted by another elevation of his LFTs. On presentation, the patient only complained of generalized weakness, although he was also noted to have scleral icterus, oral thrush, and splenomegaly on physical examination. Initially, he was continued on steroid therapy, but then fever ensued. An infectious diseases evaluation was performed and was negative. During this hospitalization, the patient demonstrated worsening anemia, thrombocytopenia, hepatic and renal function. Triglycerides and ferritin were markedly elevated (680 mg/dL and >10,000 ng/mL, respectively) which further supported a diagnosis of HLH. The patient had a third bone marrow biopsy that was consistent with HLH. A treatment plan consisting of IVIG followed by etoposide was initiated, but the patient suffered a cardiac arrest after the first day of treatment.

DISCUSSION: This case illustrates the challenge of making a timely diagnosis of HLH. Patients with HLH often have nonspecific presentations that can be mistaken for primary liver disease, infection, or malignancy among other diagnoses. A positive biopsy is not necessary for diagnosis, nor does a positive biopsy confirm diagnosis without other criteria being met. The complexity of diagnosis and high morbidity and mortality related to untreated HLH underscore the importance of having a high level of suspicion regarding a diagnosis of HLH so that treatment can be promptly initiated.

A UNIQUE CASE OF MULTIDRUG-RESISTANT LATENT TB INFECTION Deepti Chopra; Wendy Wobeser; Jorge Martinez-Cajas. Queen's University, Kingston, ON, Canada. (Tracking ID #2181982)

LEARNING OBJECTIVE #1: Recognize the risk of reactivation TB with Bortezomib-based treatment of multiple myeloma (MM)

LEARNING OBJECTIVE #2: Discuss the treatment options for known or suspected multidrug-resistant latent TB infection (MDR-LTBI)

CASE: A 72 year old retired physician was referred to the Infectious Diseases clinic for assessment and management of a remote positive Mantoux skin test and known exposure to multidrug-resistant tuberculosis (MDR-TB), in the setting of recently initiated chemotherapy for MM. His past medical history is significant for COPD, 40 pack year smoking history, obstructive sleep apnea, previous non-TB mycoplasma pneumonia, hypertension, adult mumps, and peripheral neuropathy. He has had a chronic, minimally productive cough for several years thought to be due to his COPD. He denied hemoptysis, fevers, chills, anorexia or night sweats. He was beginning to regain some of the weight he lost while caring for an ill close relative. His chemotherapy regimen includes Melphalan 18 mg PO OD and Prednisone 125 mg PO OD for 4 days followed by Bortezomib SC weekly for 4 weeks (per cycle). His physical examination only revealed mild bibasilar crackles which have been present for many years. Biochemistry demonstrated anemia and hypercalcemia but normal renal function. Skeletal survey shows lytic lesions in the cranium and left proximal humerus consistent with MM. Chest X-ray revealed a small right middle lobe calcified granuloma, first detected in 1983, prior to the development of a positive Mantoux test in April 1989 with an induration of 23 mm. Dr. X had cared for multiple patients with active pulmonary TB as well as a known case of cavitary pulmonary MDR-TB resistant to isoniazid and rifampin in the winter of 1989. His LTBI was assessed by a physician in 1989 who decided to observe him closely without chemoprophylaxis. The decision regarding current treatment for Dr. X was particularly challenging given that risks of reactivation TB in patients with MM receiving Melphalan/Prednisone/Bortezomib therapy is not well described. Similarly, there is little evidence on optimal management of MDR-LTBI. After a detailed literature search and consultation with experts in the field, the ID team opted to treat Dr. X for MDR-LTBI with Moxifloxacin and Ethambutol for at least 9 months.

DISCUSSION: A decision regarding treatment of LTBI requires an estimate of risk for development of active TB, as well as an understanding of the efficacy of treatments and associated adverse effects of selected therapy. Two retrospective Korean case series described the rate of developing active TB in patients receiving Bortezomib-based chemotherapy for MM. The first included 115 patients on Bortezomib and reported a 7 % rate of developing active TB over 6 years of observation. The second reviewed 285 patients over 8 years and reported a rate of only 1.1 %. The varying rates between trials were postulated to be secondary to different combinations of adjunctive steroids and chemotherapeutic agents used in each regimen. Moreover, these rates are not easily transferable to the Canadian patient population but suggest that the risk of reactivation TB could be significant. One case-control study by Jick et al. described an almost 5 fold increase in risk of developing new TB while receiving high dose steroid treatment. However, there is limited information on the rates of reactivation in patients with latent TB on steroids. Additionally, we found no data on the risk of reactivation TB with Melphalan therapy. In terms of treatment options for MDR-LTBI, the 2013 Canadian Standards suggest 9 months of fluoroquinolone monotherapy. One Italian study from 2006 demonstrates limited serious side effects of moxifloxacin used for an average of 6.3 months; however, this data is derived from a single centre and small sample size. In the US, consensus recommends combination therapy with oral fluoroquinolone and ethambutol for a greater duration of 12 months. A recent prospective study from Micronesia supports the practical feasibility of this approach in which daily moxifloxacin or levofloxacin plus ethambutol for a total of 12 months was well tolerated and effective in treating MDR-LTBI in the setting of contact tracing. Hence, based on review of the literature and consultation with TB experts, a decision was made to use combination therapy in our case. Nonetheless, optimal management of MDR-LTBI remains extremely challenging, particularly in the setting of chemotherapy. Further investigation is required to better estimate the risk of reactivation of LTBI during cancer treatment with novel chemotherapeutic agents, and to gain an understanding of the level of immunosuppression induced by them.

A UNIQUE CASE OF REFUSAL TO SIT Asma Khatoun¹; Leigh K. Hunter². ¹Methodist Dallas Medical Center, Dallas, TX; ²Methodist Hospitals of Dallas, Dallas, TX. (Tracking ID #2171147)

LEARNING OBJECTIVE #1: Fusobacterium is a gram-negative, non-sporeforming bacterium widely known as a human and animal pathogen. Fusobacterium's exceptional ability to adhere to both gram-negative and gram-positive plaque microorganisms in biofilms (specifically in soft tissue) makes it a highly invasive microbe. Primarily given attention for its periodontal implications, strains of Fusobacterium have been identified as pathogen in many parts of the body. We present an unusual case of vertebral osteomyelitis caused by Fusobacterium species with bacteremia and sepsis syndrome.

CASE: A 49 year old Hispanic man with past medical history of alcoholic liver cirrhosis, injection drug abuse, and chronic anemia presented to the emergency department (E.D.) with a two month history of right sided lower back pain just above the iliac bone. The pain was insidious in onset over 2 months and progressively worsened to the point of being constant, non-radiating, stabbing, aggravated by sitting and minimally relieved by walking. This pain was accompanied by intermittent, low-grade subjective fevers. Upon arrival, his vital signs were: T: 99 °F, HR: 104/min, RR: 20/min and BP: 130/85 mmHg, SaO₂: 99 % on room air. Physical examination was remarkable for poor dentition, jaundice, scleral icterus, 2+ pitting, bilateral pedal edema, asterixis, and caput medusae on a visibly distended abdomen with ascites. Straight leg raising test was negative and the patient had full mobility of the spine with no point tenderness noted. Laboratory data was significant for anemia, thrombocytopenia, mild hyponatremia, hyperbilirubinemia and ESR of 10 mm/hr and CRP of 35 mg/L. The patient was admitted for evaluation of persistent low back pain and possible sepsis. Blood cultures drawn on admission were negative. Thoracolumbar spine CT revealed lumbar spondylosis, facet arthropathy and multilevel spinal stenosis. MRI confirmed the CT results, but also revealed a partially destructive pattern involving T9-T10 with decreased T1 brightness and an epidural mass 5.7 mm×3.2 cm×5 mm positioned posterior-dorsal to T9-T10 interspace with the most likely etiologies being metastatic involvement of thoracic spine with epidural extension vs. vertebritis and discitis. The right para-midline spinal canal was narrowed to approximately 4 mm by protrusion of material arising from disk interspace. Neurosurgery was consulted regarding these findings and recommended biopsy of the mass in question. The patient developed fever with associated leukocytosis prompting resubmission of blood cultures and initiation of empiric vancomycin and piperacillin/tazobactam. Anaerobic bottles of both blood culture sets became positive for gram-negative rods at 3 days and subsequently the organism was identified as *Fusobacterium* species. Bone biopsy demonstrated abundant acute inflammation, focal necrosis and scant bone necrosis. No AFB, fungal organisms or malignant cells were identified, but anaerobic cultures ultimately grew *Fusobacterium*. Therapy was switched to Penicillin G 18 million units/day IV for 14 days and metronidazole 500 mg PO QID for a minimum of 42 days while following clinical response and ESR and CRP. Blood cultures cleared quickly and 2 weeks later, inflammatory markers were within normal limits and pain was improved.

DISCUSSION: Upon literature review, it was found that only 14 other cases of *Fusobacterium* vertebral osteomyelitis have been reported to date. In all instances, patients had relatively depressed immunity. Although *Fusobacterium* is a common occupant in human oropharynx and female genital tract, current consensus is that it should always be considered a pathogen. Most notable for its appearance in polymicrobial infections with abscess formation, *Fusobacterium* can be a standalone pathogen with hematogenous spread to regions well beyond head and neck, causing skin ulcers, long bone infections, Lemierre's disease, and is also seen in patients with colon cancer. It produces extracellular toxins that facilitate epithelial barrier breach, host mucosal invasion and immune system evasion. In the patient described above, upper GI endoscopy was within normal limits and patient refused colonoscopy. The presumptive source of infection was his carious teeth. The objective of this abstract is to highlight the virulence of *Fusobacterium* and its significant associated morbidity. Early recognition and aggressive, appropriate therapy may prevent long term sequelae in such patients.

A WOLF IN SHEEP'S CLOTHING Matthew L. Law, Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198623)

LEARNING OBJECTIVE #1: Recognize the importance of *Staphylococcus lugdunensis* infections

LEARNING OBJECTIVE #2: Understand the pathogenesis of *Staphylococcus lugdunensis* endocarditis

CASE: A 51 year-old woman presented with 3 days of persistent vertigo and nausea. She had end-stage renal disease, is on hemodialysis, and had HIV with a recent CD4 count of 105. Physical exam showed a 3/6 systolic murmur noted throughout the precordium, which was new from exam 4 weeks prior. Blood cultures consistently returned coagulase negative staphylococcus with eventual speciation into *Staphylococcus lugdunensis*. Initial transthoracic echocardiogram performed on admission showed no vegetations; repeat transthoracic echocardiogram, after persistently positive blood cultures, revealed a new vegetation on the mitral valve. Based on these findings, she was diagnosed with *S. lugdunensis* native valve endocarditis. A transesophageal echocardiogram was not performed and patient was deemed not to be a surgical candidate. Upon further view of her recent medical history, she revealed that 2 weeks prior she had a revision of her AV fistula due to difficulty with access. After 10 days of antibiotics, blood cultures returned sterile and the patient was discharged home with IV antibiotics and repeat follow-up echocardiogram.

DISCUSSION: Internists often encounter vague complaints, especially when dealing with patients on chronic hemodialysis; infection as a potential cause for these symptoms always needs to be considered. *Staphylococcus lugdunensis* was not formally recognized until 1988 when it was isolated in Lyon, France; however most likely this is not a

new infection. Early studies described it as a skin commensal, but more recently it has been found to preferentially colonize the perineal region and is rarely found in the anterior nares of hemodialysis patients. Frequently, *S. lugdunensis* is misdiagnosed as *Staphylococcus aureus*. Some isolates of *S. lugdunensis* are able to produce a membrane-bound form of the enzyme, clumping factor, which yields a positive result on coagulase testing potentially leading to the misidentification of the organism as *S. aureus*. Misidentification of *S. lugdunensis* as a *S. aureus* infection is not critical to treatment as *S. lugdunensis* virulence is more similar to *S. aureus* than other coagulase negative staphylococcus, and treatment for both is similar. Endocarditis caused by staphylococci accounts for approximately 20 to 35 % of native valve endocarditis with the majority of these infections being caused by *S. aureus*. Most of the coagulase-negative staphylococcus endocarditis are caused by *S. epidermidis* (especially prosthetic valves); however *S. lugdunensis* is emerging as a common cause of native valve endocarditis. Case reports have shown three patients on chronic hemodialysis with *S. lugdunensis* endocarditis. All three patients had AV fistula revision before the infection. This increased virulence of *S. lugdunensis* is attributed to its ability to bind to fibrinogen to extracellular matrix proteins (a typical trait of *S. aureus*), and it seems to have an increased affinity for causing embolism more so than other coagulase negative staphylococcus. Given the increased virulence, *S. lugdunensis* should be aggressively treated with both medical and possibly surgical intervention if necessary. Currently, it remains sensitive to a large number of antimicrobials, including methicillin. Persistently positive blood cultures for coagulase negative staphylococcus should be treated as a potential *S. lugdunensis* infection until speciation occurs to rule out this virulent and potentially deadly infection.

A YOUNG MALE WITH RECURRENT PNEUMONIA- LET'S THINK BEYOND THE BOX Dipti Baral¹; Bhishma Pokhrel²; Dinesh Subedi¹. ¹SUNY Upstate Medical University, Syracuse, NY; ²National Academy of Medical Sciences, Kathmandu, Nepal. (Tracking ID #2196711)

LEARNING OBJECTIVE #1: Consider the possibility of anatomic abnormalities in recurrent pneumonia

CASE: A 24-year-old male presented to the hospital with 2 months history of exertional dyspnea and 4 days history of moderate left sided pleuritic chest pain radiating to the back. He denied fever, chills, cough, hemoptysis, night sweats, weight loss and recent travel. Patient had been treated for two separate episodes of pneumonia in the last 4 months. Past medical history and family history was otherwise non-significant. On examination, he was slightly tachycardic. Rest of the physical exam including respiratory system exam was normal. Labs revealed complete blood counts of $14 \times 10^9/L$ with 75 % neutrophils. Human immunodeficiency virus test was negative. Chest X-ray showed left lower lobe opacity. He was treated on antibiotics for community acquired pneumonia. Review of previous chest X-rays and computed tomography (CT) of the thorax revealed severe consolidation in left lower base. CT angiogram of thorax later during this admission showed 9 cm well-defined area of low attenuation in the left lower lobe with dedicated pulmonary arterial and venous drainage and resolving superimposed infection within the area. A radiologic diagnosis of congenital pulmonary airway malformation (CPAM) was made. He underwent open thoracotomy with left lower lobe lobectomy. Pathologic examination demonstrated a relatively well demarcated lesion characterized by multiple bronchiole-like structures scattered within the alveolated parenchyma and 1.5×1.5 cm thin walled cyst with multiple air filled microcysts at its periphery. The final diagnosis was type 2 CPAM. Patient was doing well at 3 months' follow up.

DISCUSSION: In otherwise healthy individuals presenting with recurrent pneumonia, cause for repeated infections needs to be sought. If the same location is involved repeatedly, then any anatomic abnormality in the area needs to be considered. CPAM, previously known as congenital cystic adenomatoid malformation (CCAM) is a rare cystic lung disease with an estimated incidence of 1:25,000-1:35,000 births. With increasing use of ultrasound in pregnancy, CPAM is more frequently diagnosed prenatally. However occasionally, it may remain asymptomatic or present later in life with recurrent pulmonary infections, hemoptysis or pneumothorax. In adults, CPAMs are most commonly seen in the lower lobes. CPAM are categorized into type 0 to 4 based on where the malformation occurred within the tracheo-bronchial tree and at which stages of lung development. Given the increased risk of malignancy and recurrent infections, surgical resection is recommended in CPAM. Careful review of history and images can reveal congenital lesions like CPAM. Surgical resection prevents potential malignancy and further episodes of pneumonias in CPAM.

ACUTE ALCOHOL WITHDRAWAL-ASSOCIATED TAKOTSUBO CARDIOMYOPATHY Qiyuan Liu; Regina Felkner; John Schultz; Haley Ballard. University of South Alabama, Mobile, AL. (Tracking ID #2195239)

LEARNING OBJECTIVE #1: Recognize and manage acute alcohol withdrawal-associated Takotsubo Cardiomyopathy

CASE: A 60-year old white male with past medical history of alcohol abuse, delirium tremens, and subdural hematoma reported to the Emergency Department because of fall secondary to generalized weakness for 2 days. He did not have loss of consciousness or seizure activity. The patient consumed 1 gal of liquor per day for the past 30 years, with the last consumption being 3 days before admission. Physical examination was unremarkable except for generalized weakness. Tests showed potassium 2.8 mmol/L, bilirubin 3.8 mg/dL, total protein 7.4 g/dL, albumin 2.7 g/dL, ALT 158 units/L, and AST 339 units/L. The alcohol level was undetectable. The hypokalemia was appropriately corrected, and his asthenia improved. However, the patient developed acute alcohol withdrawal symptoms and was given lorazepam. Four days after admission, the patient developed sinus tachycardia with heart rate at 160. The chest x-ray showed bilateral pulmonary edema. The brain natriuretic peptide (BNP) was 4000 pg/ml. Though electrocardiogram showed no ST change, the troponin was moderately elevated to 0.15. Transthoracic echocardiogram (TTE) four days after admission showed a left ventricular ejection fraction (LVEF) at 25–30 % with a large area of mid to apical akinesis to dyskinesis suggestive of apical ballooning. The left heart catheterization (LHC) revealed non-ischemic cardiomyopathy with LVEF of 45 %, anterior apical and inferior apical severe hypokinesis. The patient was treated with the standard heart failure medical regimen including aspirin, furosemide, atenolol and furosemide. His symptoms improved with appropriate diuresis, and the patient was discharged home with the same regimen.

DISCUSSION: This patient presents with clinical features that met the Mayo Clinic diagnostic criteria for Takotsubo cardiomyopathy: 1) Transient hypokinesis, akinesis, or dyskinesis of the left ventricular mid segments with apical involvement; 2) Absence of obstructive coronary disease or angiographic evidence of acute plaque rupture; 3) New ECG abnormalities (either ST-segment elevation and/or T wave inversion) or modest elevation in cardiac troponin; 4) Absence of pheochromocytoma or myocarditis. The LHC four days after TTE showed improved LVEF from 25 to 30 % to 45 %. The patient reported improved tolerance of physical activities back to his baseline in the outpatient follow up 3 weeks later. Hemodynamically stable patients of Takotsubo cardiomyopathy are generally treated with diuretics, angiotensin-converting enzyme inhibitors and beta-blockers. To reduce the risk of thromboembolism, antiplatelet or anticoagulant therapy should be considered in the patients with loss of motion of left ventricular apex until the contractility of the apex is improved. Regarding the long-term management of Takotsubo cardiomyopathy, no data support the continuous use of these drugs for the prevention of Takotsubo cardiomyopathy recurrence or improvement of survival rate. After the left ventricular function normalizes, these drugs may be discontinued if they have no other indications for use. The pathophysiology of Takotsubo Cardiomyopathy has been postulated to involve excess catecholamine release precipitated by an acute emotional or physical stressor, and acute alcohol withdrawal is a well-described state of excessive adrenergic activity. However, Takotsubo cardiomyopathy in the context of acute alcohol withdrawal has been only rarely described. It is important for an internist to recognize this condition and provide the appropriate care to the patient.

ACUTE INFECTIOUS PURPURA FULMINANS, A CAUSE OF PURPLE DIGITS Hyejo Jun. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2188846)

LEARNING OBJECTIVE #1: To describe the differential diagnoses for the purple/black digit

LEARNING OBJECTIVE #2: To review the pathophysiology of acute infectious purpura fulminans

CASE: The patient is a 52-year-old Caucasian male with a history of heavy tobacco use and epidermolysis bullosa simplex (EBS) who was transferred from an outside hospital with persistent black discoloration of the fingers and toes. The patient initially presented to the outside hospital 1 week prior to transfer with painful hands and feet, with rapid progression to purple and black discoloration of the fingers and toes. Vital signs revealed hypotension but no fever. Laboratory examination demonstrated leukocytosis with considerable bandemia, thrombocytopenia, acute kidney injury, and transaminitis. Urine drug screen was negative for illicit substances. Gram stain of the blood showed gram-negative rods but an organism could not be speciated despite multiple blood cultures. Peripheral smear demonstrated profound thrombocytopenia and sudden increase in granulocytes with marked left shift that, in light of the clinical picture, suggested DIC. Coagulation times were not available, but d-dimer was reportedly very elevated. The patient was started on aggressive fluid resuscitation and broad-spectrum antibiotics for septic shock complicated by DIC. No pressor support was initiated but the patient did receive 2 packs of platelets. Further diagnostic work up was notable for a normal ANA, ANCA, cryoglobulins, cold hemagglutinins, HIV, and hepatitis panel. Pan-CT was unremarkable. Lower extremity dopplers and MRA (which reached only up to the level of the ankles) revealed patent vessels. ABIs of the upper and lower extremities were normal but photoplethysmography showed no pulse amplitudes distally in the digits and toes. After

the patient was stabilized and acute kidney injury and thrombocytopenia resolved, the patient was transferred to our hospital for further management of persistent black fingers and toes. Physical examination upon admission to our hospital was remarkable for normal vital signs, necrosis of nearly all fingers and toes to the metatarsophalangeal articulations, bullae around the feet, necrosis of the tip of the nose, and palpable radial and pedal pulses. Repeat blood cultures showed no growth. Our own laboratory obtained the blood cultures from the outside hospital, but again, an organism could not be speciated. An upper extremity angiogram showed sluggish flow in the digital and palmar arteries, and superficial hand biopsy showed no evidence of vasculitis. Culture of the biopsy was unrevealing. Discussion with our consultants in Rheumatology, Dermatology, Vascular Surgery, and Plastics Surgery, yielded the most likely diagnosis being ischemic injury from sepsis, or acute infectious purpura fulminans. The decision was made to allow the areas of necrosis to demarcate and minimize the extent of amputations. The patient was discharged with a 2-week course of piperacillin-tazobactam after consultation with ID. Vascular surgery performed bilateral Choparts and left small finger amputations and he is now following up closely for wound care.

DISCUSSION: This case demonstrates an interesting manifestation of septic shock. Our initial differential diagnoses included Buerger's disease, vessel thrombosis, small-vessel vasculitis, or vessel thrombosis. Buerger's disease was thought to be less likely as it is not known to cause such systemic injury. Acute arterial thrombosis or emboli were less likely as the patient had palpable pulses diffusely. There was no evidence of vasculitis on laboratory or pathologic examination. Urine drug screen was negative for cocaine, which made levamisole-induced vasculitis unlikely. The patient denied a history of trauma or cold related symptoms. Given the clinical history of septic shock with GNRs on gram stain, acute infectious purpura fulminans was thought to be the most likely diagnosis. The presentation was thought not to be a flare of the patient's underlying EBS, though perhaps it made the patient more susceptible to injury. There are idiopathic versions of purpura fulminans, but infectious purpura fulminans is considered the more common. Meningococcus is one of the most common pathogens, and disease occurs due to a disturbance between anticoagulant and procoagulant endothelial cell activity, mediated by bacterial endotoxin and other inflammatory markers. What was surprising was that an organism that caused such systemic injury to the patient was unable to be grown, on multiple cultures, at both hospitals. This subjected the patient to a prolonged course of a broad-spectrum antibiotic without the ability to narrow coverage based on susceptibility. In the end, the patient was fortunately saved from more extensive amputations. This case affords an opportunity to review differential diagnoses for the purple digit and the pathogenesis for acute infectious purpura fulminans.

ACUTE MYOCARDIAL INFARCTION IN A MALE YOUNG PATIENT—IT'S NOT JUST THE SMOKING! Navdeep Kaur. Presence Saint Francis hospital, Evanston, IL. (Tracking ID #2198895)

LEARNING OBJECTIVE #1: Review the non-traditional risk factors for acute myocardial infarction in young patients.

LEARNING OBJECTIVE #2: Recognize the diagnostic criteria and management of antiphospholipid syndrome.

CASE: A 30 year old African American male with no significant past medical history presented with intermittent chest pain, numbness and tingling of his left arm, and diaphoresis for 2 days. Patient had no family history of early onset Coronary Artery Disease (CAD). Patient did have 10 pack year smoking history. Vital signs were stable and physical examination as otherwise unremarkable. Initial EKG showed sinus rhythm with anterolateral ST depression. Laboratory studies revealed elevated serum Troponins (0.14 and 0.19). Urine toxicology screen was negative for cocaine. Patient continued to have chest pain and repeat ECG in 1 h showed frequent premature ventricular complexes in a pattern of bigeminy with anterolateral ST depression. Left heart catheterization was done which showed subtotal ostial LAD stenosis with thrombus. Successful thrombectomy was done with aspiration catheter and residual lesion less than 40 %. Due to proximity of LAD stenosis to left main, no stent was placed. Patient was started on strict medical management with aspirin, clopidogrel, statin and beta blocker. On day 4 of admission, patient again developed chest pain. Repeat EKG showed ST elevation in anterolateral and inferior leads and patient was taken for repeat cardiac catheterization that showed subtotal stenosis of LAD. Successful PCI with placement of bare metal stent was done. Lab work showed positive lupus anticoagulant. Anti cardiolipin and anti beta 2-glycoprotein antibodies were negative. Work up for SLE was negative. He was started on warfarin, bridged with enoxaparin. His homocysteine level was elevated to 40Umol/L, vitamin B12 levels were low (88 pg/ml) with positive intrinsic factor antibodies. He was started on vitamin b12 replacement injections. He was discharged on dual antiplatelet therapy and warfarin. At 6 month follow up, repeat lupus anticoagulant was positive, thus confirming the diagnosis of anti-phospholipid antibody syndrome. Patient was continued on life-long anticoagulation with warfarin.

DISCUSSION: The antiphospholipid syndrome (APS) is an autoimmune disorder, characterized by the presence of venous or arterial thrombotic event and/or thrombotic events related to pregnancy and positive laboratory tests for antiphospholipid antibodies (anticardiolipin, ant-beta 2-glycoprotein or lupus anticoagulant) on two or more occasions at least 12 weeks apart. APS occurs either as a primary condition or in the setting of an underlying disease, particularly systemic lupus erythematosus (SLE). The most common presenting manifestation in APS is deep vein thrombosis of the lower limbs (32 %). Acute Myocardial infarction (MI), like in our patient is the first manifestation of APS in only about 2.8 % of patients. Additional risk factor in our case was hyperhomocysteinemia due to vitamin B12 deficiency with pernicious anemia. Hyperhomocysteinemia appears to be an independent risk factor for CAD but a benefit from lowering the homocysteine concentration on cardiovascular disease remains unproven. A young patient with Acute MI should thus be evaluated for non-traditional risk factors like APS, hyperhomocysteinemia, factor V Leiden mutation, abnormal lipoprotein levels, and protein C or S deficiency. Smoking history and/or other drug use might not always be the culprit. Challenge in treatment of such patients is the need for aggressive life long anticoagulation while considering the risks of bleeding. Our patient was thus continued on life-long anticoagulation with warfarin with close monitoring.

ACUTE RENAL INFARCT CASE SERIES Tariq M. Yousuf¹; Edgar V. Lerma²; Hina Iqbal¹. ¹Advocate Christ Medical Center, Oak Brook, IL; ²University of Illinois at Chicago College of Medicine/ Associates in Nephrology, SC, Berwyn, IL. (Tracking ID #2196836)

LEARNING OBJECTIVE #1: Recognize the clinical features associated with acute renal infarction and the importance of considering this diagnosis in patients presenting with acute kidney injury. Acute Renal Infarction is a commonly under-diagnosed condition. Acute renal infarction usually presents with the constellation of signs and symptoms of abdominal or flank pain, elevation of LDH, elevation of white blood count, hematuria, oliguria or anuria, fever, nausea, vomiting and occasionally elevation of liver enzymes. Differential diagnosis includes acute appendicitis, nephrolithiasis, cholecystitis, urinary tract infection, biliary pathology or even mesenteric Ischemia. This report will hopefully highlight the rarity of acute renal infarction and the importance of considering the diagnosis of acute renal infarction in patients presenting with acute kidney injury. The myriad of findings of 1) acute abdominal pain or flank pain, 2) elevation of LDH and 3) a high risk of thromboembolism in a patient presenting with acute kidney injury should make the astute clinician consider the possibility of acute renal infarction in the differential diagnosis.

CASE: Case 1 is a 55 year old male with a past history of coronary artery disease s/p stent placement, AAA s/p repair and atrial fibrillation who presented to the emergency room with a 2 day history of intractable abdominal discomfort localized to the left flank and right lower quadrant (RLQ) with radiation to the right femoral area. On physical exam, the patient was in moderate distress and had significant tenderness over the RLQ. In addition, he also had notable left sided costovertebral angle tenderness. Pertinent laboratory studies included: WBC of 8.0, creatinine of 1.41mg/dL and INR of 1.2. He was known to be non-compliant with warfarin anticoagulation. CT of abdomen revealed areas of decreased perfusion involving the lower pole of the right kidney with perinephric stranding, new occlusion of the left internal iliac artery and aneurysms involving the right common iliac artery as well as both common femoral arteries. Duplex ultrasonography revealed the presence of aneurysms in both common femoral arteries and increased velocity in the right proximal third of the renal artery. Patient was afforded supportive measures and an adequate analgesic regimen and subsequently showed significant clinical improvement as well as resolution of laboratory abnormalities. Case 2 is that of a 53 year old male who has a past history of chronic kidney disease and atrial fibrillation who presented to the emergency room with an acute onset of abdominal discomfort localized to the left flank with radiation to the back. Physical exam revealed stable vitals and an irregular pulse. On examination, he had left CVA tenderness. Initial labs revealed creatinine of 3.5mg/dL, INR of 1.7 and significantly elevated LDH (1323). CT scan of the abdomen demonstrated the absence of the right kidney. A MAG3 nuclear medicine scan revealed diminished flow to the left kidney. A CT angiogram revealed evidence of thrombus in the left renal artery. He was then started on anticoagulation with heparin and a wire guided thrombolysis with thrombectomy was performed. Although there was brisk urine output production post-procedure, there was no evidence of renal recovery in the ensuing days; therefore, he was subsequently initiated on hemodialysis.

DISCUSSION: Acute renal infarction is a commonly missed phenomenon and it should be high on the list of differential diagnosis if a patient presents with abdominal pain, elevated LDH and predispositions to increased risk of thromboembolism. The mainstay of treatment remains to be appropriate anticoagulation. Our cases demonstrate acute renal infarction likely secondary to atrial fibrillation with and without therapeutic anticoagulation. Atrial fibrillation, as the most common arrhythmia identified in

hospitalized patients, warrants increased awareness of its association with acute renal infarction so that it can be promptly recognized and managed appropriately.

ADEM: ACUTE DISSEMINATED ENCEPHALOMYELITIS OR A DISEASE EASILY MISSED? Naveen Nannapaneni²; Joseph Buensalido²; Jonathan A. Cohn¹. ¹Wayne State University, Detroit, MI; ²Wayne State University, Royal Oak, MI. (Tracking ID #2190168)

LEARNING OBJECTIVE #1: Recognize the clinical features of acute disseminated encephalomyelitis.

CASE: Acute disseminated encephalomyelitis (ADEM) is an inflammatory response in the brain most often seen after a viral infection. It typically manifests with acute onset and rapid in progression encephalopathy, motor, and sensory deficits. It can be overlooked when evaluating patients with acute encephalopathy, as presented in our case. A 65-year-old male with diabetes, hypertension and coronary artery disease was transferred from an outside hospital to the neurology intensive care unit due to concerns for status epilepticus. His family reports that three days prior he was found unarousable from sleep and brought via EMS to the hospital after a 2-day antecedent history of a non-productive cough, nasal congestion and chills which were not improved with trimethoprim-sulfamethoxazole. He travelled to both India and Sri Lanka one month ago and to Florida twice since then, receiving a flu vaccine but no malaria prophylaxis prior to all his travel. His wife, who accompanied him on all trips, reported having similar symptoms and that neither experienced headaches, nuchal rigidity or photophobia. Upon presentation to the outside hospital his vitals were stable but he required intubation as physical exam revealed an inability to protect his own airway. Initial chest and abdominal radiographs were negative for acute processes. CT head/angio, MRI brain and brain perfusion studies were also without acute abnormalities. He received vancomycin, cefepime, ampicillin, doxycycline and acyclovir in addition to dexamethasone empirically for meningitis. Two days later a lumbar puncture revealed a monocyte predominant pleocytosis, WBC 89 cells/mL, protein 73 mg/dL, glucose 97 mg/dL with an unremarkable Gram stain. He was suspected to have generalized seizures when weaned off propofol and was transferred to our facility as a result. Infectious Disease was consulted and recommended replacing cefepime with ceftriaxone for treatment of meningitis pending culture finalization. His extensive microbiologic cultures, serologies and PCRs in both blood and CSF did not reveal a causative pathogenic organism and his antibiotics were discontinued and the differential narrowed to ADEM. Within 48 h he was successfully weaned from propofol and extubated without recurrence of seizures and returned to his neurologic baseline, ultimately being discharged without further complication.

DISCUSSION: While a multitude of confounding variables in this case- antecedent antibiotic use prior to cultures (both at home and in the hospital), recent international and domestic travel, and a history of sick contacts- resulted in a broad initial differential, a systemic evaluation was able to rule out many of the potential causes. His history of a precursor upper respiratory infection, rapidly deteriorating encephalopathy, and swift improvement with dexamethasone all support a diagnosis of ADEM. Further substantiation can be provided with MRI findings of demyelination, but are not compulsory for diagnosis. Treatment relies on immune suppression with glucocorticoids as the first-line therapy as the purported pathogenesis is autoimmune in nature. Our case provides a cautious reminder to the inclusion of ADEM in the differential for causes of acute encephalopathy as its rarity leads many to overlook it as a possible diagnosis.

ADULT INTUSSUSCEPTION CAUSED BY VISCERAL KAPOSI 'S SARCOMA IN A PATIENT WITH CD4 COUNT OVER 200 Emory Hsu¹; Varun Phadke¹; Maria M. Rivera⁴; Schuyler D. Livingston³; Minh Nguyen². ¹Emory University, Atlanta, GA; ²Emory University SOM, Atlanta, GA; ³Emory University School of Medicine, Decatur, GA; ⁴Virginia Commonwealth University, Richmond, VA. (Tracking ID #2199457)

LEARNING OBJECTIVE #1: Recognize Kaposi's sarcoma in HIV infected individuals even in the setting of antiretroviral therapy

LEARNING OBJECTIVE #2: Recognize intussusception as an etiology of abdominal pain in an adult with Kaposi's sarcoma

CASE: A 39 year old Nigerian female presented with several weeks of odynophagia, crampy abdominal pain, fatigue, and decreased oral intake. She had been previously healthy until one year prior to admission, when she began to experience unintentional weight loss. Eight months prior to admission, she developed violaceous plaques on her extremities, face, and trunk. She was subsequently diagnosed with human immunodeficiency virus (HIV) infection with an initial CD4 count of 144 cells/mm³, and initiated on antiretroviral therapy (ART) with a fixed-dose combination of efavirenz, emtricitabine, and tenofovir. After 5 months of therapy, her CD4 count had increased to 240 cells/mm³. One month prior to admission, she developed oropharyngeal and abdominal pain, exacerbated by food intake and associated with nausea, but no diarrhea, hematochezia, or

melen. She also reported bilateral swelling of her lower extremities, as well as severe fatigue. Upon admission, the patient was afebrile, with a heart rate of 100 beats per minute, and a blood pressure of 102/47. Her weight was 54 kg (body mass index of 18.25 kg/m²). A focused physical exam demonstrated cachexia, palpable lymphadenopathy, diffuse abdominal tenderness, moderate pitting edema to the thighs bilaterally, and multiple violaceous papules of variable size on the trunk, face, and extremities. Laboratory testing demonstrated a CD4 count of 274 cells/mm³. Computed tomography of the abdomen and pelvis demonstrated numerous intestinal and peritoneal masses, as well as large bowel intussusception. An exploratory laparotomy with resection of the largest masses and a right hemicolectomy were performed. Pathology confirmed a diagnosis of gastrointestinal Kaposi's sarcoma (KS). Post-operatively, the patient experienced multiple bouts of abdominal pain and distention confirmed with repeat imaging to be due to recurrent intussusception. She was managed non-operatively, but required intensive care support for hypotension. Chemotherapy was initiated with liposomal doxorubicin. Her ART was changed to intravenous zidovudine, subcutaneous enfuvirtide, and oral liquid darunavir and ritonavir to maximize bioavailability given presumed gastrointestinal malabsorption. By post-operative day 30, she had marked symptomatic improvement, and repeat abdominal imaging demonstrated resolution of her obstructive pattern and intussusceptions. On hospital day 50, the patient was discharged to home.

DISCUSSION: Kaposi's sarcoma (KS) is an angioproliferative disorder caused by infection with human herpes virus 8 (HHV-8), whose incidence is greatly increased in individuals with HIV and in particular those with CD4 counts of less than 200 cells/mm³ (Antman 2000). The cutaneous form is the most common manifestation, with widely distributed violaceous plaques and nodules. Visceral KS is less common, and can involve the oral cavity, gastrointestinal tract, and respiratory tract. Symptoms are non-specific and include abdominal pain, weight loss, nausea, vomiting, dyspnea, and hemoptysis. Intussusception is a relatively rare complication of visceral KS, and can affect both children and adults. In children, intussusception is a more commonly encountered diagnosis than in adults, though mortality is still high when KS is the cause (Ramdial 2010). The first reported case of an adult with intussusception due to KS was in 1988 (Hofstetter 1988), prior to the era of combination ART. Visceral KS can occur in patients lacking dermatological findings, such as in a 42 year old HIV positive man who presented with ileocolic intussusception despite having no skin lesions (Nidimusili 2013). In another case, a 31 year old man had presented with abdominal pain, and was found to have ileal intussusception leading to a diagnosis of both visceral KS and HIV/AIDS (Wang 2002). Notably, these patients were not on ART, and had CD4 counts under 200 cells/mm³. However, an increasing number of KS diagnoses are being made in individuals with higher CD4 counts (Crum-Cianflone 2010). Maurer et al. described a small cluster of patients with CD4 counts greater than 300 cells/mm³ who nevertheless presented with KS (Maurer 2007). These nine patients only had limited cutaneous disease, without visceral involvement. Our patient, who was on ART and had a CD4 count of 274 cells/mm³, presented with intussusception secondary to extensive visceral KS requiring cytoreductive surgery. Exacerbation or unmasking of KS in the context of ART initiation has been previously described as attributed to immune reconstitution inflammatory syndrome (IRIS), but symptoms typically manifest within 3 months of ART initiation (Leidner 2005; Weir 1997). Thus, further exploration of the etiology that underlies the clinical heterogeneity of KS in HIV-infected patients is warranted.

AFOP'S TALE Jose Garza; Angela Christensen; Hana Safah. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198245)

LEARNING OBJECTIVE #1: Recognize the clinical presentation and histology of interstitial pneumonia

LEARNING OBJECTIVE #2: Review etiologies of acute fibrinous and organizing pneumonia

CASE: A 59 year-old man presented with an episode of hemoptysis and mild dyspnea on exertion. Three months prior, he had experienced progressive fatigue and a ten-pound weight loss. He denied night sweats, fever, chills, or sick contacts. The patient had a 40-pack year history of smoking. He had been treated for myelodysplastic syndrome with transformation to acute myelogenous leukemia with azacitidine, pegfilgrastim, and decitabine. His vitals were stable. He had no head, neck, or axillary lymphadenopathy. He had decreased breath sounds throughout all lung fields with no crackles, wheeze, egophony, or dullness to percussion. He was pancytopenic. HIV, serum cryptococcal antigen, urine histoplasma antigen, KOH smear, serum fungitell, and B-galactomanin were negative. Fungal blood cultures and routine blood cultures were negative. Three sets of sputum cultures for AFB were negative. CT scan of the thorax revealed extensive hilar lymphadenopathy, left lung nodular opacities, and a 5.0 by 4.6 by 3.1 cm irregular mass along the lateral right major fissure. Bronchoalveolar lavage was non-diagnostic by cytology. Routine culture results from lavage were no growth and AFB smear and KOH

smear were negative. Histology from transbronchial biopsy revealed acute fibrinous and organizing pneumonitis.

DISCUSSION: Acute Fibrinous and Organizing Pneumonia (AFOP) is an unusual variant of idiopathic interstitial pneumonia. It was first described by Beasley et al. in 2002 as a histological pattern differing from that of diffuse alveolar damage (DAD), bronchiolitis obliterans with organizing pneumonia (OP), and eosinophilic pneumonia (EP). Symptoms are similar to that of other infiltrative lung diseases, including dyspnea, fever, non-productive cough, and hemoptysis. Radiographic findings vary along the spectrum of basilar dependent consolidations and ground glass opacities to focal and diffuse parenchymal abnormality. Diagnosis is made by a distinct histologic pattern characterized by the presence of intra-alveolar fibrin, fibrin deposition in a patchy distribution, lack of hyaline membranes, and the absence of noticeable eosinophils. Due to the patchy distribution, biopsy specimens from bronchoscopy yield lower diagnosis. Surgical lung biopsy has a higher yield and should be preformed if there is high suspicion. The dominant histologic finding in AFOP is organizing intra-alveolar fibrin, which differs from the classical patterns of both DAD and OP. AFOP also lacks the hyaline membranes seen in DAD and has a patchy distribution of fibrin rather than diffuse. AFOP is differentiated from EP on histology by its lack of eosinophils. The etiology of AFOP is unknown and considered idiopathic. Associations with inhalants (coal mining, hairspray, construction), infection (hemophilus influenza, H1N1), connective tissue disease, immune suppression, and drug exposure have been described in literature. Both azacitidine and decitabine are hypomethylating agents used in treatment of myelodysplastic syndrome. Though few in number, reports have noted development of AFOP with administration of both chemotherapeutic agents. Treatment in large part is discontinuation of any offending agent. Steroids, antibiotics, and cyclophosphamide have been used. In cases in which steroids were used, there was not a definitive advantage as it did not change mortality outcome. There has been some success with the combination of prednisone and cyclophosphamide. In this patient's case he presented with symptoms of dyspnea and hemoptysis. A diagnosis was made by histology. He is currently being treated with a 2 week course of methylprednisone followed by taper. He has shown signs of clinical and radiographic improvement.

AIR ON THE MIND, A CASE OF NONTRAUMATIC PNEUMOCEPHALUS Michael Gillette; Philip J. Putnam. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198804)

LEARNING OBJECTIVE #1: Recognize signs and symptoms of venous air embolisms

LEARNING OBJECTIVE #2: Discuss the treatment of pneumocephalus

CASE: A 63 year old man presents to the hospital for a reversal of an ostomy. Five months earlier, the patient had perforated diverticular disease that required an anterior resection of the rectum and placement of a Hartman's Pouch. The initial attempt to reverse the ostomy could not be completed due to adhesions. A second attempt via an exploratory laparotomy was successful. He was extubated on hospital day 10 and a right internal jugular central line was removed on hospital day 15. On hospital day 16, he got out of bed for the first time and suddenly became non-responsive. On exam, he had a new holosystolic murmur, did not withdraw from pain, but did have papillary, corneal, and gag reflexes. A code blue was called and the patient was intubated. CT scans revealed air within the right ventricle, right internal jugular vein, and air in the right cerebral hemisphere with out any air in the liver or portal circulation. A bedside echocardiogram showed a brisk flow of gas through the right ventricle. An EKG showed a new onset RBBB. Mastisol and a tegaderm patch was then placed over the site of the right IJ and patient was placed in trendelenburg position. No further gas was visualized in the heart and a formal echocardiogram did not reveal a PFO. A FiO2 of 100 % on the ventilator was used to aid in cerebral air resorption. However, he continued to decompensate requiring multiple pressors and a follow-up MRI revealed evolving ischemic strokes in the bilateral cortical, right caudate and left cerebellar regions. Care was withdrawn on hospital day 23 and he expired.

DISCUSSION: Cases of nontraumatic cerebral air embolism are largely iatrogenic in origin and are somewhat rare. However, an air embolus should be considered in individuals with altered mental status after a central line manipulation or removal. Air that enters the venous circulation will usually enter the lungs and cause decreased gas exchange. If a patent foramen ovale is present, the air can cross to the left side of the heart and enter the systemic circulation. In the case of this patient, the air entry was brisk enough to travel retrograde up the internal jugular veins into the sagittal sinuses. Cerebral air in the smaller vessels will block the flow of blood and act as a space-occupying lesion inside the closed cranium. The resulting pathology is quite similar to an acute ischemic stroke with focal deficits, confusion, and seizure activity. Treatment for cerebral air centers on supportive care and oxygen therapy. One hundred percent oxygen treats both potential hypoxia and helps create a pressure gradient favorable for air resorption. The current literature favors leaving the patient flat as the trendelenburg position fails to prevent further air from entering the brain and increases cerebral edema.

AKI FROM UNILATERAL URETERAL OBSTRUCTION: ONE HARD CALCULUS PROBLEM THAT NEEDED TO BE WORKED OUT Randy Chung¹; Andrew Caruso^{2, 1}; Jeffrey T. Bates^{2, 1}. ¹Baylor College of Medicine, Houston, TX; ²Michael E. DeBakey VA Medical Center, Houston, TX. (Tracking ID #2199258)

LEARNING OBJECTIVE #1: Recognize that unilateral ureteral obstruction due to a renal calculus can result in acute kidney injury in the setting of a solitary functional kidney.

LEARNING OBJECTIVE #2: Diagnose ureteral calculus with computed tomography, despite absence on ultrasonography, when acute kidney injury is unexplained.

CASE: A 58-year-old man was admitted for acute kidney injury (AKI). His medical history included prostate cancer status post radiation therapy, hypertension and hyperlipidemia. Two days prior to admission, the patient started having subjective fevers and chills, nausea, vomiting, and decreased oral intake. He denied abdominal pain, flank pain, dysuria, hematuria, or difficulty urinating. Physical examination was remarkable only for mild left costovertebral angle tenderness; he did not have abdominal tenderness, suprapubic fullness or tenderness, or edema. Laboratory studies disclosed a serum creatinine level of 6.1 mg/dL (compared to 1.3 mg/dL 1 week prior) and blood urea nitrogen level of 55 mg/dL (compared to 20 mg/dL 1 week prior). Urinalysis was positive for 14 red blood cells; there were no white blood cells or cellular casts. Renal ultrasound showed very mild bilateral hydronephrosis, left renal hypertrophy, right renal cortical atrophy, and no renal calculi. A noncontrast computed tomography (CT) scan of the abdomen showed an obstructing 5 mm×3 mm calculus at the left ureterovesical junction with mild left hydronephrosis and an atrophic right kidney. In the setting of a solitary functional kidney, urology was consulted for urgent cystoscopy and ureteral stent placement. However, the ureter was unsuccessfully cannulated, so the patient underwent left nephrostomy tube placement. His symptoms resolved and his serum creatinine level improved to 1.8 mg/dL by the time of discharge. Four weeks after discharge, a retrograde ureteroscopy was performed, and the calculus was successfully removed with basket extraction.

DISCUSSION: Acute unilateral ureteral obstruction due to renal calculi is a frequent event, affecting up to 15 % of the population worldwide. Common presenting symptoms include nausea, vomiting, hematuria, and severe abdominal or flank pain radiating to the groin. Serum creatinine level and urine output are usually not affected when the contralateral kidney is functioning normally. In this patient, the compromised function of the right atrophic kidney led to the development of AKI from the left unilateral ureteral obstruction. The presentation was unusual in that the patient did not experience pain from renal colic. Nonetheless, early diagnosis and prompt treatment are of utmost importance in preserving or restoring renal function. While routine imaging studies usually add little to the diagnostic workup of AKI, ultrasound imaging of the urinary tract is indicated when the probability of urinary obstruction is high or the kidney failure is unexplained. In the present case, ultrasound showed evidence of left urinary tract obstruction but failed to show the presence of any calculi. Low sensitivity of about 19 % is reported for sonographic detection of ureteral calculi, as most of the ureter is obscured by shadowing from overlying bowel gas. Unexplained obstruction requires additional imaging with CT, which remains the best method for detection of calculi, with sensitivity and specificity estimated at 96 and 99 %, respectively.

ALL THAT WHEEZES IS NOT ASTHMA Shlomo Kuperman^{2, 1}; Danit Arad^{2, 1}. ¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical center, Bronx, NY. (Tracking ID #2198082)

LEARNING OBJECTIVE #1: Recognize wheezing has many etiologies

LEARNING OBJECTIVE #2: Differentiate between wheezes and stridor

CASE: A 53 year-old man presented with three days of shortness of breath and productive cough. He reported chest tightness, wheezing, and thick yellow sputum. He had no fevers but did have night sweats. He had a history of asthma and COPD and suffered from intermittent exacerbations with similar presentations; occasionally requiring hospitalization, usually non-responsive to nebulizers and treated with oral steroids. He had diffuse wheezes on exam, remainder of examination was unremarkable. CXR and routine labs were within normal limits. He was initially treated with bronchodilators with a mild response. On hospital day two, he was noted to be in tripod position and breathing was labored with accessory muscle use. Inspiratory and expiratory stridor was heard on auscultation of his neck which was more pronounced with rapid breathing suggesting upper airway involvement. Bedside laryngoscopy did not show any edema or occlusion of upper airway. CT neck revealed diffuse tracheobronchial thickening suggestive of relapsing polychondritis. On further examination, a saddle nose, and dysmorphic helices and scapha of the outer ear were present further supporting the diagnosis.

DISCUSSION: Wheezing is a commonly encountered physical exam finding and often attributed to asthma or COPD. However, there are several other less common etiologies. Wheezes originate in proximal conducting airway of any size and thought to be secondary to oscillation of opposing narrowed airway. The pitch can vary and be either monophonic

or polyphonic. A wheeze can be inspiratory, expiratory, or biphasic. The differential diagnosis for wheezing includes pulmonary edema, carcinoid, sarcoidosis, aspiration, parasitic infections, Bronchiolitis, pulmonary embolism, and many other airway disease processes which cause extrapulmonary or intrapulmonary obstruction. Stridor is a high-pitched, musical sound produced as turbulent flow passes through a narrowed segment of the upper respiratory tract. It can be secondary to trauma, viral or bacterial infection, tracheal collapse or stenosis, vocal chord dysfunction, foreign body ingestion or aspiration, or angioedema. Stridor can be differentiated from wheezing as being a monophonic sound, more prominent during inspiration, and louder over the neck than over the chest. Although usually inspiratory, stridor can also be expiratory, or both. In our patient, the history of poor response to bronchodilators and frequent necessity of steroids should raise suspicion of an alternative diagnosis. It is important for physicians to recognize that wheezes and stridor can be a manifestation of many disease processes that affect the airway. In one review of 95 patients with vocal-cord dysfunction, greater than half were incorrectly diagnosed with asthma for years, majority have been treated with glucocorticoids, averaged six hospital admissions per year, and 28 % were intubated. Relapsing polychondritis is a rare autoimmune disease with inflammation and destruction of cartilaginous structures, it can involve almost any organ and has a high risk of misdiagnosis. Laryngotracheobronchial involvement appears in fifty percent of patients. Tracheal collapse, and secondary pulmonary infections are amongst the leading causes of death among patients with relapsing polychondritis. In the above case, the recognition that the lung sounds were upper airway in origin alerted the team and enabled them to arrive at the correct diagnosis.

ALLERGIC TO CANCER Alanna Wong; Yelena Averbukh; Rebecca Koransky. Montefiore Medical Center, Bronx, NY. (Tracking ID #2199975)

LEARNING OBJECTIVE #1: To recognize the clinical presentation of paraneoplastic neurological syndromes in a patient with lung cancer.

LEARNING OBJECTIVE #2: To distinguish between paraneoplastic syndrome and leptomeningeal carcinomatosis based on the results of diagnostic workup.

CASE: A 70 year-old man with no significant medical history presented after an episode of confusion and lethargy. For the past 2 months, he had been having intermittent headaches, difficulty remaining alert and focused, along with progressive fatigue associated with an unintentional 12-pound weight loss, constant dry mouth, and changes in his taste. He was occasionally repetitious and tangential during his mental status exam, unusual for a highly educated professor. Extensive infectious workup was negative. CT thorax revealed a 6 cm×4 cm left upper lung mass with subsequent biopsy revealing papillary adenocarcinoma. MRI brain with abnormal enhancement of the internal auditory canals and cerebellar folia was concerning for leptomeningeal metastasis versus paraneoplastic syndrome. Serial lumbar punctures demonstrated elevated white blood cells (predominately lymphocytes), elevated protein, and low glucose consistent with leptomeningeal metastasis, though negative for malignant cells. Paraneoplastic panel, including antibodies to neuronal, glial, and Purkinje cells, was negative. However, further evaluation revealed nonspecific autoimmune cells in the cerebral spinal fluid suggestive of paraneoplastic syndrome. Unfortunately, the patient's mental status rapidly declined and his hospital course was complicated by simple partial seizures. His family eventually decided on hospice in accordance with the patient's wishes.

DISCUSSION: Paraneoplastic neurological syndromes are rare, affecting less than 1 % of cancer patients, but found in a disproportionate number of patients with lung cancer (up to 5 %). A variable group of disorders, the pathogenesis is believed to be immune-mediated with antibody and T-cell responses against nervous system antigens that are ectopically expressed by the tumor. Clinical presentation depends on what portion of the nervous system is affected. Symptoms of limbic encephalitis include cognitive impairment and complex-partial seizures versus brainstem encephalitis symptoms, which can include dysphagia, sensorineural deafness, and trigeminal sensory loss. Different types of onconeural antibodies have also been known to cause neuropsychiatric manifestations. It is important to note that in 80 % of patients presenting with paraneoplastic neurological syndromes, the primary malignancy is diagnosed later in the course of the disease. Distinguishing between paraneoplastic neurologic syndromes and leptomeningeal carcinomatosis is difficult as clinical presentation can be similar. In leptomeningeal carcinomatosis, malignant cells spread through the subarachnoid space, resulting in either occluded CSF flow from associated inflammation causing mass effect, nerve dysfunction from direct tumor involvement, or invasion of the brain parenchyma. Patients often present with a broad range of multifocal neurological dysfunctions. In 30–50 % of patients, headache is the most common initial symptom and is due to either increased intracranial pressure or meningeal irritation. Patients may also present with encephalopathy and are lethargic, confused, forgetful, or disoriented. Subtle symptoms caused by cranial neuropathies from invasion of the cranial nerves include diplopia, facial pain, sensorineural hearing loss, dysarthria and dysphagia. In distinguishing between these two conditions, MRI brain is non-specific as abnormal enhancement in periventricular regions

can be seen in both cases. Cerebral spinal fluid cytology is essential in attempting to differentiate between one and the other. The specificity of CSF cytology is high as false-positive results are rare. Malignant cells identified within the CSF definitively diagnose a patient with leptomeningeal carcinomatosis whereas paraneoplastic antibodies confirm paraneoplastic neurologic syndrome. Multiple lumbar puncture samples negative for malignant cytology are required, with each increasing in sensitivity to rule out leptomeningeal carcinomatosis (71, 86, 90, 98 %). The combination of negative cytology and the absence of meningeal enhancement on MRI is more indicative of paraneoplastic syndrome. As a clinician, one must be highly suspicious of paraneoplastic neurological syndromes in a patient with lung cancer who has suggestive signs and symptoms as a positive diagnosis can drastically alter treatment options and overall prognosis. In a patient with paraneoplastic neurological syndrome, immunosuppressants may be offered as treatment, and with improvement, possible curative resection of the primary tumor.

AMI“NO”DARONE WHEN THE RHYTHM IS AGAINST THE LUNGS Marianna Sargsyan¹; Harvey J. Friedman³; Malav P. Parikh²; Karandeep Singh¹. ¹Saint Francis Hospital, Evanston, IL; ²Saint Francis Hospital, Evanston, IL; ³SF Hospital of Evanston, Evanston, IL. (Tracking ID #2198296)

LEARNING OBJECTIVE #1: Amiodarone is a popular drug for treating arrhythmias, but enthusiasm for this agent has been tempered by its major side-effect of amiodarone pulmonary toxicity (APT). It is usually a chronic condition, but rarely acute and sub-acute forms are seen. Diagnosis of acute APT can be very challenging and requires a high index of suspicion.

CASE: A 58-year-old male presented to the hospital with complaints of dyspnea, cough and fever for last ten days. He appeared tachypneic and in moderate respiratory distress. On physical exam, vital signs were: O₂ saturation: 90 %-room air, pulse:98/min, BP: 144/70 mmHg, temperature:100.9.F. The patient had normal S1-S2, crackles in the right-sided lung fields and trace pedal edema. Routine investigations showed leukocytosis, normal troponin levels and brain natriuretic peptide (BNP) of 598 pg/ml. CXR revealed right-sided pulmonary infiltrates and echocardiogram showed ejection fraction of 25 %. He was treated with a combination of antibiotics and diuretics for possible pneumonia and congestive heart failure exacerbation (CHF). However he had a gradual worsening of the clinical status characterized by worsening dyspnea, increasing oxygen requirement and diffuse bilateral infiltrations on CXR, eventually requiring intubation. Review of the medications and past medical history revealed that 9 months before current presentation, patient was started on amiodarone (200 mg/day) after he had suffered from acute myocardial infarction and congestive heart failure, when he underwent CABG and ACID placement. At this stage, amiodarone was stopped and patient was started on prednisone with a probable diagnosis of amiodarone induced acute pulmonary toxicity. He showed remarkable clinical and radiological improvement over next 7-10 days. Eventually he was extubated and discharged to long-term care facility with tapering dose of prednisone.

DISCUSSION: Amiodarone can produce lung damage directly by-cytotoxic effect and indirectly by-immunological reaction. It is usually an indolent illness, however acute APT characterized by rapidly progressing diffuse pneumonitis with acute respiratory distress syndrome (ARDS) is also a possibility. It is diagnosed based on clinical and radiological findings after exclusion of common cardio-pulmonary diseases. Patients with acute APT respond well to steroids and stopping amiodarone, however higher mortality rate are seen in patients with underlying lung disease and reduced EF. Amiodarone toxicity usually co-relates with a total cumulative dose or daily dose of 400 mg or more for more than 2 months. Our case is unusual due to development of APT at relatively low maintenance dose of 200 mg/day. Thus, probably there is no 'safe' dose of amiodarone and acute APT can occur even at 200 mg/day, the dose most commonly used by cardiologists. Hence clinicians should be alert to the possibility of APT regardless of the dose and duration of treatment and patients taking amiodarone should be closely monitored to ensure prompt diagnosis should this toxicity occur.

AMIODARONE INDUCED TOXICITY Xin Cai²; Sujata Bhushan¹. ¹Dallas VA Medical Center, Dallas, TX; ²UT Southwestern Medical Center, Dallas, TX. (Tracking ID #2191494)

LEARNING OBJECTIVE #1: Recognize the clinical features of atrial fibrillation due to amiodarone-induced thyrotoxicosis (AIT).

LEARNING OBJECTIVE #2: Diagnose and manage AIT

CASE: A 77-year-old male with atrial flutter and COPD presented with palpitations, increasing lower extremity edema, 10 lb weight gain and worsening dyspnea on exertion over the past few months. Patient first developed atrial fibrillation (AF) in 2004. Electrophysiology study in 2011 revealed left sided atypical atrial flutter, patient was started on amiodarone 200 mg daily and maintained in normal sinus rhythm until current admission. Relevant exam and lab findings included elevated jugular venous distension, bilateral interstitial infiltrates on chest X-ray, atypical atrial flutter at 110 bpm on ECG, and an

undetectable thyroid stimulating hormone (TSH) with a free thyroxine (T4) of 2.52 (patient's TSH in 05/2014 was 4.48 with a free-T4 of 1.10). Transthoracic echocardiography revealed global hypokinesis with depressed left ventricle (LV) systolic function with an ejection fraction (EF) of 29 %, a significant decline compared to LVEF of 51 % in 02/2012. Thyroid ultrasound revealed no nodules. Amiodarone was stopped and patient was started on furosemide for volume overload, metoprolol and digoxin for rate control, and methimazole 20 mg BID along with prednisone 30 mg daily for management of likely amiodarone induced thyrotoxicosis (AIT). Patient's condition gradually improved with rate control and downward trend of T4. He was discharged with the above medications with outpatient follow-up for atrial flutter ablation and management of AIT.

DISCUSSION: Two major goals in the management of AF are to prevent thromboembolic events and to offer symptomatic relief. Both rate- and rhythm-control strategies have been shown to offer similar mortality and morbidity benefits. Amiodarone is often preferred over other anti-arrhythmics due to its superiority in maintaining sinus rhythm and lower incidence of torsades de pointes. However, its benefits often come at the expense of side effects including chronic interstitial pneumonitis, elevated aminotransferase levels, sinus bradycardia or AV nodal block, and thyroid dysfunction (both hypo- and hyper-thyroidism), which could paradoxically exacerbate AF leading to congestive heart failure (CHF). Amiodarone induced thyroid dysfunction likely results from its high iodine content and direct toxicity to the thyroid gland. Serum T4 levels rise by 20-40 % during the first month of therapy and then gradually return to high normal. Serum T3 levels decrease by up to 30 % in the first few weeks of therapy and remain slightly decreased or low normal. TSH levels usually rise after starting therapy but return to normal in 2-3 months. Clinical reviews and reports suggest the prevalence of amiodarone induced thyroid dysfunction is between 2 and 30 % depending on an individual's baseline thyroid function. Two types of Amiodarone Induced Thyrotoxicity (AIT) have been described. Type 1 usually affects patients with latent or preexisting thyroid disorders and is more common in areas of low iodine intake. It is caused by iodine-induced excess thyroid hormone synthesis and release (Jod-Basedow phenomenon). Type 2 occurs in patients with a previously normal thyroid gland and is caused by a destructive thyroiditis that leads to the release of preformed thyroid hormones. Diagnosis is made by elevated T4, elevated T3, undetectable TSH; T3 levels are increased in hyperthyroidism, while they are decreased in early phases of treatment with amiodarone. Thyroid autoantibodies are generally absent in type 2 AIT but usually positive in type 1 AIT. An ultrasonogram of the thyroid that shows hypoechoic or nodular patterns or increased gland size is more indicative of type 1. Continuation of amiodarone treatment does not alter the medical management of thyrotoxicosis, but it reduces the chances of a successful outcome. Even if amiodarone therapy is stopped, thyrotoxicosis persists for up to 8 months because of the drug's long half-life. Discontinuation of the drug has no immediate benefit. Amiodarone therapy is usually continued unless it is ineffective in treating the arrhythmia or toxicity in other organs is evident. Type 1 AIT is treated with high doses of thionamides (eg, methimazole [40-60 mg/d] or propylthiouracil [600-800 mg/d]). Type 2 Thyrotoxicosis requires a relatively long course of glucocorticoids (start at 40 mg and taper over months, until T4 normalizes). Unknown type 1 vs 2 is treated with a combination of glucocorticoids and thionamides. A rapid response suggests type 2 AIT; thionamides can be tapered. A poor initial response suggests type 1 AIT; the steroids can be tapered. RAIU is not preferred, as the iodine of amiodarone inhibits uptake by the gland. Thyroidectomy can be considered for type 1 thyrotoxicosis, but only after the euthyroid state is established and if there is a need to restart amiodarone. AIT should be considered in a patient on amiodarone with recurrent atrial fibrillation.

AMYLOID FIBRILLATION: UNEXPECTED DIAGNOSIS, UNFORTUNATE PROGNOSIS Paul Leis; Robert E. Graham. Lenox Hill Hospital, New York, NY. (Tracking ID #2199450)

LEARNING OBJECTIVE #1: Discuss cardiac amyloidosis, and identify its key findings seen on electrocardiogram and echocardiogram.

LEARNING OBJECTIVE #2: Recognize cardiac amyloidosis as an etiology of atrial fibrillation.

CASE: A 60 year-old woman with a history of recurrent atrial fibrillation presented for elective radiofrequency ablation (RFA). Her vital signs were within normal limits. She had bilateral lower extremity swelling that ascended up to her knees. Her electrocardiogram showed known atrial fibrillation at a rate of 66 beats per minute with low voltage QRS complexes in the limb leads. The RFA was complicated by an episode of pulseless electrical activity with cardiac arrest and successful resuscitation. An echocardiogram was performed which revealed severe left ventricular concentric hypertrophy with preserved ejection fraction, as well as evidence of inter-atrial septal thickening. At this point, cardiac amyloidosis was suspected. A serum protein electrophoresis highlighted elevated lambda free light chains at a level of 66.4 mg/dL (normal 0.5700-2.63 mg/dL). Bone marrow biopsy confirmed plasma cell myeloma. An endomyocardial biopsy was pursued to further investigate the cardiac abnormalities, and revealed amorphous pale pink material. Congo red and crystal violet stains confirmed the diagnosis of cardiac amyloidosis.

DISCUSSION: Amyloid is an insoluble fibrillar protein that arises from many diverse diseases, most commonly plasma cell dyscrasias. Amyloidosis refers to the infiltration of multiple organs by these insoluble deposits, where myocardial involvement carries one of the worst prognoses. Cardiac amyloidosis is the term for myocardial disease caused by amyloid infiltration that can be found extracellularly throughout the heart. The amyloid deposits occur in both the atria and ventricles, affecting the conduction pathways, coronary vasculature, and contractile function of the heart. The most common cardiac arrhythmia seen in cardiac amyloidosis is atrial fibrillation, occurring in 10–15 % of patients. This is a result of perivascular fibrosis which tends to affect the sinus node leading to atrial arrhythmias. Amyloid deposits lead to other electrocardiogram findings including low-voltage QRS amplitudes defined as ≤ 0.5 mV in all limb leads or ≤ 1 mV in all precordial leads. Pseudoinfarct patterns can also be seen, which are depicted as QS waves in consecutive leads. Echocardiographic findings in cardiac amyloidosis include left ventricular wall and atrial septal thickening, with the latter being more specific for the disease. A thickened heart leads to worsening cardiac relaxation and compliance, leading to elevated filling pressures. The ejection fraction is often preserved and a "granular sparkling" of the myocardium can be seen on echocardiogram. Recognizing specific electrocardiogram and echocardiographic findings suggestive of cardiac amyloidosis is essential in prompting early treatment of the underlying disorder, given the better response to therapy with early diagnosis.

AN ACE INHIBITOR OF SPADES: AN UNSUAL CAUSE OF ENTERITIS Srikar R. Mapakshi; Neelima Reddy; Rajasekhar Katuru; Catalina Negulescu; Brandon Amant. Baton Rouge General-Tulane Internal Medicine Residency program, Baton rouge, LA. (Tracking ID #2199301)

LEARNING OBJECTIVE #1: Recognize an underappreciated cause of abdominal pain in patients on an ACEI.

LEARNING OBJECTIVE #2: Include visceral angioedema in the differential diagnosis of symptomatic patients taking ACEI

CASE: A 37-year-old African-American female was admitted with 2-week history of persistent generalized abdominal pain associated with nausea, emesis and diarrhea. She denied any fever and any relation of pain with food intake. Two weeks prior to this admission, she was discharged from an outside hospital with presumed gastroenteritis for similar complaints with an abdominal ultrasound at that time showing sludge in gall bladder without cholecystitis. Persistent symptoms lead to an outpatient surgical evaluation and a laparoscopic cholecystectomy. Despite surgery, her ongoing symptoms prompted gastroenterology consultation leading to this hospitalization. PMH is significant for newly diagnosed hypertension for which she was started on ACE inhibitor (ACEI) by her PCP. She denied drug allergies and usage of tobacco, alcohol or illicit drugs. On admission, she was afebrile and hemodynamically stable. She only had mild transaminitis on lab work. Stool studies including *Clostridium difficile* were negative. She was started on empiric intravenous antibiotics without significant improvement of symptoms. On further questioning she recalled that she started having abdominal pain, vomiting and diarrhea on the day she was started on ACEI. Contrast-enhanced CT abdomen and pelvis revealed multiple loops of small bowel wall thickening involving distal ileum but sparing terminal ileum with adjacent mesenteric edema and ascites. Given the strong temporal correlation between symptom onset and initiation of ACEI a diagnosis of drug-induced visceral angioedema was made and ACEI was discontinued. Within 24 h of ACEI discontinuation patient reported significant improvement of symptoms.

DISCUSSION: Visceral angioedema poses a diagnostic challenge because it involves internal organs that are not classically affected by ACEI induced angioedema. This condition is more commonly seen in women compared to men, with predominant symptoms being abdominal pain, vomiting, ascites, diarrhea, and leukocytosis¹. Contrast enhanced CT of the abdomen and pelvis is the imaging modality of choice to evaluate for bowel wall thickening and free fluid consistent with visceral angioedema². Bradykinin associated vasodilatation is the most widely accepted theory for the etiology of angioedema³. Symptoms usually resolve within 48 h of ACEI discontinuation⁴. We hope this case will increase awareness of ACEI induced visceral angioedema as an important and under-recognized complication of ACE inhibitor therapy. A correct diagnosis in cases presenting with acute abdominal symptoms and a history of ACEI intake hinges on a high index of suspicion for visceral angioedema. Timely recognition of this entity is essential to prevent undue burden to the patient with unnecessary invasive procedures and bring about quick symptomatic relief. **References:** 1. Korniyenko A, Alviar CL, Cordova JP, Messerli FH. Visceral angioedema due to angiotensin-converting enzyme inhibitor therapy. *Cleve Clin J Med.* 2011;78(5):297–304. [PubMed] 2. De Backer AI, De Schepper AM, Vandevenne JE, Schoeters P, Michielsens P, Stevens WJ. CT of angioedema of the small bowel. *AJR* 2001; 176:649–652. [Abstract] [Medline] 3. Molinaro G, Cugno M, Perez M, et al. Angiotensin-converting enzyme inhibitor-associated angioedema is characterized by a slower degradation of des-arginine(9)-bradykinin. *J Pharmacol Exp Ther* 2002; 303:232–237. [PubMed] 4. Abdelmalek MF, Douglas DD. Lisinopril-induced isolated visceral angioedema: review of ACE-inhibitor-induced small bowel angioedema. *Dig Dis Sci* 1997; 42:847–850. [Medline]

AN ADULT WITH ATOMOXETINE-INDUCED HEPATITIS: A REPORT OF A RARE CASE Francis E. Dailey¹; Samuel Burstein². ¹Cedars-Sinai Medical Center, Los Angeles, CA; ²VA Greater Los Angeles Healthcare System, Los Angeles, CA. (Tracking ID #2200271)

LEARNING OBJECTIVE #1: Recognize symptoms stemming from adverse reactions associated with atomoxetine therapy

LEARNING OBJECTIVE #2: Diagnose acute hepatitis secondary to a rare adverse reaction from a medication in common use

CASE: A 59 year old Caucasian gentleman with Attention Deficit Hyperactivity Disorder (ADHD) presented to his primary care provider after developing abdominal pain, decreased appetite, fatigue, and jaundice over a 7-day period 3 weeks after beginning atomoxetine. He had no prior history of liver disease, but had been exposed to Hepatitis C with undetectable viral loads and to Hepatitis B with subsequent immunity. The patient was taking hydrochlorothiazide and mirtazapine but was not taking any other medications or herbs. The patient was abusing heroin intravenously several times per week, using clean needles and not sharing. He was currently smoking a half-pack of cigarettes daily without any alcohol use. His vital signs were normal. Examination was significant for generalized jaundice, conjunctival icterus, and mild right upper quadrant tenderness. There was no rash and no hepatosplenomegaly. His initial liver enzymes were significant for a total bilirubin of 14.3 mg/dL (direct 7.1), alanine aminotransferase (ALT) of 3566, aspartate aminotransferase (AST) of 2934, and serum alkaline phosphatase (ALP) of 269 U/L. The patient was instructed to stop taking atomoxetine, and sent to the emergency department for abnormal liver tests. Three days later, the patient presented to the emergency department with the same complaints but stated that the abdominal pain had improved. His vital signs and physical exam were unchanged. Labs were significant for platelets 110 k/uL, prothrombin time 15.3 s, international normalized ratio 1.4, total bilirubin of 13.4 mg/dL (direct 7.5), ALT 2306 U/L, AST 881 U/L, ALP 214 U/L. Urine toxicology demonstrated opiates. Serum acetaminophen and ethanol levels were undetectable. Abdominal ultrasound showed no evidence of hepatic vein thrombosis or ischemic process. Tests for antibodies to Hepatitis A and B confirmed immunity; Hepatitis C RNA was undetectable. Atomoxetine was discontinued and the patient was monitored on supportive measures. He markedly improved over the next several days, with his jaundice and abdominal pain resolved and all of his abnormal labs downtrending during hospital admission. His discharge laboratory values showed a total bilirubin of 5.2 mg/dL, ALT 850 U/L, AST 161 U/L, ALP 199 U/L. A literature search performed for similar cases revealed few cases of acute hepatitis from atomoxetine. Because recurrence with re-exposure has been reported, the patient was instructed to avoid atomoxetine.

DISCUSSION: ADHD is the most common childhood neurobehavioral disorder in the world, with a prevalence of 6–8 %, and often persists into adulthood. Because it is associated with a significant impairment in social, occupational, and academic settings, pharmacotherapy is of the ultimate importance. While stimulants are the most tested and commonly prescribed treatments for ADHD and demonstrate the greatest efficacy, non-stimulants—such as Atomoxetine—are often preferred due to less potential for abuse and a greater overall side effect profile. This medication is considered both safe and effective, and is associated with only a few adverse effects, mostly anti-cholinergic. Very rarely, there have been cases reported of hepatotoxicity, causing a modified label to include severe liver injury among its adverse events. However, a current PubMed literature search demonstrates that since atomoxetine was approved for use in 2002, there are only four reported cases of this medication inducing liver injury. Here, we described a case of acute hepatitis in an adult occurring after initiation of atomoxetine therapy, with a combination of jaundice and high serum aminotransferase levels. Upon discontinuation of this medication, the patient's jaundice resolved and the laboratory levels began to normalize. Two standardized scales, the International Organization of Medical Science Diagnostic Scale and the Adverse Drug Reaction Probability Scale, were applied to assess causality of our patient's acute hepatitis, and both labeled the association of atomoxetine and hepatitis as "probable." While a positive rechallenge would have made this association "definitive," our patient showed a marked improvement after discontinuation of the medication and was instructed to remain off of it. To our knowledge, there are only four other similar cases of atomoxetine-induced hepatitis reported in the literature, mostly in children. While most of the hepatic abnormalities secondary to atomoxetine are transient and do not pose a serious risk, our case demonstrates a serious potential to lead to acute liver failure. Therefore, our case emphasizes the importance of providers and patients recognizing symptoms stemming from adverse reactions associated with atomoxetine therapy.

AN ATYPICAL CASE OF HEMOPTYSIS Ruth W. Wang¹; Theodore Long. Yale University School of Medicine, New Haven, CT. (Tracking ID #2179042)

LEARNING OBJECTIVE #1: Recognize atypical mycoplasma pneumonia as a possible etiology of hemoptysis in patients with underlying sarcoidosis

LEARNING OBJECTIVE #2: Highlight bronchoscopy as an important diagnostic tool in confirming diffuse alveolar hemorrhage in patients with hemoptysis

CASE: Infections are the major cause of hemoptysis, which can result from diffuse alveolar hemorrhage (DAH) or localized pulmonary hemorrhage, in adults. In patients with hemoptysis, thorough infectious work-up should accompany investigations of other possible causes. A 45 year old African American gentleman with hypertension, obstructive sleep apnea, and stage IV pulmonary sarcoidosis with cardiac involvement presented to the Emergency Department (ED) in May 2013 with dyspnea and two episodes of coughing up dime-sized, dark-red blood, in the setting of a 2-month history of dry cough. Upon presentation in the Emergency Department (ED) the patient was dyspneic and afebrile, with oxygen saturation of 84–89 % on room air, decreased from a baseline of 96 % on room air a week prior to admission. Lung fields were clear to auscultation bilaterally. A chest radiograph revealed hyperinflated lungs with large bullae in the right upper lung zone and airspace opacities in the left lung and right middle and lower lung zone. Samples were obtained for blood culture and the patient was started on 1 g intravenous vancomycin and 3.375 g piperacillin/tazobactam. One dose of 400 mg intravenous moxifloxacin was administered for concern of aspiration pneumonia. The patient's oxygen saturation briefly improved to 96–100 % on 4 l of supplemental oxygen via nasal cannula but decreased to 90 % requiring oxygen supplementation of 40 % via a non-rebreather face mask. The patient was admitted to the medical intensive care unit (MICU) for concern of worsening hemorrhage that would require bronchoscopy and the potential for escalating oxygen requirement. In the MICU, the patient's oxygen saturation increased to greater than 96 % on 4 l of supplemental oxygen. The patient's respiratory status remained stable with oxygen saturation of up to 98 % on 3 l of oxygen via nasal cannula, weaned from 4 l. Doxycycline was administered for empiric coverage of atypical pneumonia. The patient remained afebrile, hemodynamically stable, with negative blood cultures, and stable respiratory status. Upon transfer to the medical floor, bronchoscopy was conducted to confirm the diagnosis of suspected diffuse alveolar hemorrhage (DAH) and rule out a large endobronchial lesion, which although not detected on CT, could have been a contributing factor to hemoptysis and hypoxic respiratory distress. A serial aliquot lavage was performed with blood tinged return that increased with each subsequent lavage confirming DAH. Bronchial inspection did not show any evidence of actively bleeding endobronchial lesions. Direct fluorescent antibody testing, subsequent polymerase-chain-reaction (PCR) tests for respiratory viruses, including adenovirus, rhinovirus, influenza A/B, parainfluenza, human metapneumovirus, and RSV were negative. Further work-ups for urine legionella antigen, Streptolysin O antibody, HIV-1/HIV-2 antibodies, and alpha-1 antitrypsin were also negative. Cultures, PCP silver stain, tests for fungal organisms and acid fast bacilli of BAL washings were all negative. Blood cultures were negative. Rheumatoid factor, antibodies against DNase B, beta-2 glycoprotein, cardiolipin, double-stranded DNA, and glomerular basement membrane, obtained to rule out systemic autoimmune diseases, were negative. A urine test for legionella antigen was negative. A *Mycoplasma pneumoniae* IgM antibody test, obtained when the patient initially presented, was positive.

DISCUSSION: This case points to the need to consider atypical mycoplasma pneumonia as a possible etiology of hemoptysis in patients with underlying sarcoidosis. Although *Mycoplasma pneumoniae* is a common cause of respiratory infections in adults it is rarely associated with diffuse alveolar hemorrhage. Recognition of this atypical infection is important for implementation of appropriate antibiotic therapy.

AN AUTOIMMUNE PARADOX OF IMMUNODEFICIENCY Sonia Jarrett¹; Harish Jasti². ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Mount Sinai, New York, NY. (Tracking ID #2196609)

LEARNING OBJECTIVE #1: Identify the clinical features associated with Common Variable Immunodeficiency (CVID)

LEARNING OBJECTIVE #2: Describe the diagnosis and management of CVID

CASE: A 50-year-old female with a past medical history significant for diabetes mellitus type I, refractory autoimmune hemolytic anemia (AIHA), immune thrombocytopenic purpura (ITP), recently diagnosed interstitial lung disease (ILD) and hypogammaglobulinemia presented with shortness of breath (SOB), fever to 102 °F, and malaise for the past 4 days. She also endorsed night sweats and intermittently productive cough. She denied hemoptysis, nausea, vomiting, or diarrhea. She previously had unlimited exercise tolerance but now experienced SOB after walking 1 block. She had been hospitalized and treated for presumed pneumonia 4 times in the past 12 months. Due to unresolved pulmonary infiltrates at her last hospitalization, she underwent video-assisted thoracoscopic surgery with biopsy findings suggestive of organizing pneumonia with non-caseating granulomas. Medications at the time included insulin and albuterol, budesonide-formoterol, ipratropium, and fluticasone inhalers. Social history was significant for secondhand smoke exposure during childhood, but she never smoked or used recreational drugs. She had no occupational exposures that would induce lung disease.

Physical exam revealed a tired-appearing Caucasian woman in no acute distress. Oxygen saturation was 98 % on room air. Lung exam was remarkable for bronchial breath sounds in all lung fields, with no evidence of accessory muscle use. Cardiac and abdominal exams were unremarkable. Labs were notable for hemoglobin 8.9, platelets 119, and lactate dehydrogenase 155. White blood cell count and electrolytes were within normal limits. ANA, ANCA, SCL, myositis, Sjogrens, and HSP panels were negative. Immunoglobulin levels were: IgG 34 (normal range: 767–1590 mg/dL), IgM 21 (37–286 mg/dL), IgA <1 (61–356 mg/dL). Chest x-ray showed interstitial infiltrates with no evidence of active infection. Given her history of AIHA, ITP, ILD, recurrent pneumonia, and near agammaglobulinemia, CVID was considered the most likely diagnosis.

DISCUSSION: CVID is the most common symptomatic primary immunodeficiency disorder affecting children and adults with a prevalence of 1 in 25,000 people. The disorder involves impaired B cell differentiation which causes defective immunoglobulin production. There is a family history in 20–25 % of cases. The diagnostic criteria are: immune globulin levels 2 standard deviations below the mean for age; absent isohemagglutinins and/or poor response to vaccines; and exclusion of other causes of hypogammaglobulinemia. The clinical presentation of CVID is heterogeneous, often leading to a delay in diagnosis. The majority of patients are diagnosed between ages 20–45, but diagnosis is often delayed by 5–7 years after the onset of symptoms. The clinical manifestations of CVID comprise 6 major categories. 1) Infections: particularly recurrent pneumonia and rhinosinusitis. 2) Chronic lung disease: including bronchiectasis or ILD due to recurrent pulmonary infections. 3) Autoimmune disease: with AIHA, ITP, or Evans syndrome found in 25 % of CVID cases. The diagnosis of autoimmune cytopenia precedes detection of hypogammaglobulinemia in up to 60 % of CVID patients. 4) Granulomatous disease: with non-caseating granuloma formation in lymphoid or solid organs. 5) Gastrointestinal disease: often presenting as chronic diarrhea and malabsorption. 6) Neoplasms: with increased risk of developing non-Hodgkin lymphoma. The first-line treatment of CVID is intravenous immunoglobulin (IVIG) replacement therapy which reduces the number of infections and hospitalizations. Treatment involves monthly IVIG infusions and measurement of IgG trough levels every 6 months. The goal of therapy is to increase IgG levels to normal range. Recurrent infections and chronic conditions associated with CVID result in considerable morbidity and mortality. Given the effective available therapy, early recognition and management of CVID is critical in decreasing morbidity and mortality of this relatively prevalent condition.

AN ITCHY BUEGER Yuto Arai²; Christine Kwan¹. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Teine-ku, Sapporo, Japan. (Tracking ID #2194396)

LEARNING OBJECTIVE #1: Recognize that Buerger disease can present with itchiness

LEARNING OBJECTIVE #2: Diagnose Buerger disease even during the summer

CASE: A 49 years old Asian woman comes in the summer with 2 months' bilateral fingers' itchiness despite topical steroids for a diagnosis of eczema. In fact, the itchiness has turned to pain that is sharp, 9/10, non-radiating, not improved by anything, and worsened by baths. Negative symptoms include swelling, increased warmth, and extreme temperature exposure; other review of systems is within normal limits (WNL). The patient's past medical history includes adenomyosis; she has no medications or allergies. She smokes 0.5 pack/day for 20 years and drinks 1 beer/day but denies any recreational drug use. Her father has rheumatoid arthritis. On physical exam, vital signs include temperature 36.6°, pulse 70, blood pressure 110/74, respiratory rate 20, and O2 saturation 100 % room air. Generally, the patient has an agonized look due to itchiness and pain. On extremities, the fingertips of her right first, second, and fifth digits and left first and second digits are violaceous, cool, and painful to palpation with no erosions or ulcers. Her bilateral palms show excoriations. Pulses are 2+ except for the right radial, popliteal, and dorsalis pedal pulses, which are 0. The distal interphalangeal joints of the above corresponding digits are tender to palpation but not red or swollen; flexion is decreased to 10°. The rest of the exam is WNL. On labs, the patient's complete blood count, chemistry, coagulation panel, hemoglobin A1C, and autoimmune markers are WNL. Foot Doppler ultrasound and computed tomography angiogram show corkscrew sign. Plethysmography confirms poor blood circulation in her fingers. She is thus clinically diagnosed with Buerger disease and is prescribed a prostacyclin inhibitor, alprostadil, without symptomatic improvement. Two weeks after smoking cessation, however, her symptoms do gradually improve.

DISCUSSION: Buerger disease, or thromboangiitis obliterans, an autoimmune disorder related to long-term smoking, affects small vessels although its pathogenesis remains unclear. Typical ischemic symptoms and signs include pain (81 %), ulcerations (67 %), Raynaud's phenomenon (40 %), and gangrene of the fingers; 13 % of patients have arthralgias. The clinical diagnostic criteria include age <45; current/recent tobacco use; distal extremity ischemia; typical arteriographic findings of Buerger disease, like corkscrew collaterals; and exclusion of autoimmune disease, thrombophilia, diabetes, and

proximal embolic sources. Moreover, most occur in the winter possibly because many also have Raynaud's phenomenon. In the above patient, while she does smoke, her summer symptoms of bilateral fingers' itchiness and pain without ulcerations are not initially consistent with a vascular occlusive disease. In fact, a literature search does not show any reports of itchiness in Buerger disease. Although the pathophysiology of ischemia's causing itchiness is poorly understood, a theory includes the mediators' being released by ischemia, thereby stimulating nerve fibers' transmitting the itchiness. In addition to histamine's transmitting the sense of itch, interleukins and prostaglandins, whose production can be induced by COX-2, whose transcription pathway is activated by oxygenated stress and ischemia, can also stimulate nerve fibers. Itchiness, therefore, can be a symptom of ischemia.

AN OLD ACQUAINTANCE REDISCOVERED AS A NEW EVIL: CANNABIS INDUCED MYOCARDIOPATHY Mohammed A. Bahaa Aldeen¹; Nibras Talibmamy²; Essam Nakhl¹; Omar Nadhem¹; Roger D. Smalligan¹; Rahul Chandra¹. ¹Texas Tech Univ Health Sc Center—Amarillo, Amarillo, TX; ²Kufa, Najaf, Iraq. (Tracking ID #2179809)

LEARNING OBJECTIVE #1: To recognize acute cannabis intoxication as a cause of myocarditis in young patients.

LEARNING OBJECTIVE #2: To learn about the various newer toxic effects of contemporary forms of street cannabis on the human heart.

CASE: A 21-year-old African American woman with no past medical history and on no medications came with nausea and vomiting that started a few hours after smoking marijuana. She was seen in the ER and sent home with pantoprazole. The patient returned 8 h later with severe mid-chest tightness, 10/10 in intensity, which woke her up from sleep. The pain radiated to both shoulders and jaw with some shortness of breath, sweating, nausea and clear vomitus. There were no aggravating or relieving factors. No history of trauma. No history of previous chest pain/heart attacks. No family history of premature MI or CVA. She used occasional alcohol but no binge drinking. She admitted to smoking marijuana for the last 2 years. Physical exam: BP 124/77, heart rate 90, respirations 14, temperature 98.1, 100 % O₂ saturation on room air. Heart was regular rate and rhythm without murmurs, gallops, or rubs. Lung and abdominal exams were normal. She had normal distal pulses, no calf tenderness, no leg edema, and no skin rash. Laboratory: normal WBC and differential, Hgb 13.4. Electrolytes, liver function and lipase were all normal. Troponin was high at 0.78 and 2 h later was 1.56. Urine toxicology was positive for only cannabis. Alcohol level was zero. Pregnancy test: negative. Chest X-ray was normal. The first EKG was normal sinus rhythm but a few hours later she developed diffuse ST depressions and multiple ventricular ectopic beats. Later, she developed runs of nonsustained ventricular tachycardia (NSVT). Hospital Course: The patient was initially treated as acute coronary syndrome with full dose heparin, beta blockers, nitroglycerine and amiodarone drip for her NSVT. Echocardiogram showed normal LV EF of 60 %, mild ventricular enlargement, small pericardial effusion and mild tricuspid regurgitation. Left heart catheterization showed normal coronary circulation. Her HIV, hepatitis, Coxsackie, West Nile virus, Mycoplasma and Chlamydia testing were all negative. In light of acute cannabis abuse with positive troponins, with negative cardiac cath and diffuse ST changes on EKG the patient was finally diagnosed with acute cannabis induced myocarditis. Her condition was stabilized and she was discharged in good condition three days later.

DISCUSSION: *Cannabis sativa* or marijuana has been known to man since 800 A.D, as a substance that alleviates pain and cures insomnia. Over time cannabis developed into one of the most widely misused recreational drugs. It has a dose-dependent acute effect on the autonomic nervous system. At low doses it causes an increase in sympathetic activity and a decrease in parasympathetic activity. This causes tachycardia and increased cardiac output. High doses of cannabis inhibit sympathetic activity and increase parasympathetic activity leading to bradycardia and hypotension. Acute cardiac effects occur commonly in the first 2–72 h of intoxication. Cannabis has also been linked to acute coronary vasospasm manifesting as acute coronary syndrome. Peripheral arteriopathy (cannabis arteritis) has also been reported. Reversible EKG abnormalities including ST-T segment changes with increased ectopy has been seen. There are also case reports of cardiac muscle damage manifesting as myocarditis, myopericarditis and serious cardiac arrhythmias including sudden cardiac death, especially if combined with alcohol. The severity of myocarditis is variable with occasional permanent damage leading to heart failure with one report of a patient requiring a left ventricular assist device. Myocardial biopsy pathology has shown sparse lymphocytic myocardial infiltrates, subendocardial and interstitial fibrosis with normal vasculature. The reason more cardiovascular effects are being reported in the recent times may relate to the increased content of marijuana in each smoked joint (100–150 mg per joint compared to 10 mg/joint in the 1960's). Another concern is that the street cannabis available today is known often contains additives intended to increase the psychotropic effects. These substances may have concomitant cardiac side effects. Typical additives include industrial etchants, solvents, micro glass beads, pesticide derivatives and

chemical sugars. Cannabis has classically not been considered to the medical community as a possible fatal substance of abuse. Hence its association with deaths is often underreported. However, coroner autopsy studies in Ireland and addict surveillance programs in France have raised concerns about cannabis as a lethal agent over the last 8 years. Our case reminds physicians of a rare but potentially serious toxic effect of cannabis use which may be seen more and more as legalization is granted or considered in various states in the US.

AN UNCOMMON CAUSE OF BACK PAIN Nathan Moore. Washington University, Saint Louis, MO. (Tracking ID #2181185)

LEARNING OBJECTIVE #1: Recognize the clinical features of multiple myeloma in the younger population

CASE: HPI: A 44 year old male with history of diabetes, anxiety and hyperlipidemia visited our resident clinic to establish care. Eight months ago the patient started developing intermittent crampy leg pain with movement. He ascribed it to his job as a construction worker. Some time after that also he developed intermittent low back pain that radiated to the backs of his legs, associated with numbness and tingling. Initially the pain was only present when working but progressed to intermittent pain at rest. He visited several chiropractors without relief. Two months prior to presentation, the patient fell onto his L side while working with resulting pain and subjective weakness in his L arm and leg, especially over the past 3 weeks. He feels "clumsy" while walking. He visited an urgent care center 6 weeks ago with these complaints where he was prescribed oxycodone, flexeril and ibuprofen and told to follow up with a primary care physician. **PMH:** Diabetes, anxiety, HLD **Family History:** MI in father, lung cancer in mother **Medications:** None. **Social History:** Worked a desk job for many years before being laid off 2 years ago and starting working in construction. He lost his health insurance at that time and has had difficulty seeing a PCP. He quit working 2 months ago. Tobacco—1 PPD for 25 years; Alcohol—Quit 8 months ago, previously heavy drinker; Drugs—None; Travel—None **Review of Systems:** Pertinent positives—significant weight loss since starting his new job; occasional subjective fevers; progressive fatigue; chronic dry cough; constipation (BM every ~4 days); frequent urination; chronic anxiety; cold intolerance; polydipsia. **Physical Exam:** T 37.1, HR 94, RR 18, BP 138/94, 100 % on room air, BMI 21 Constitutional: Chronically ill appearing white male in a wheelchair. Appears uncomfortable. Cardio: Regular rate and rhythm, no murmurs/rubs/gallops. Lungs: CTAB Abdomen: Soft, nontender, nondistended, + bowel sounds. No organomegaly. Skin: Dry skin Neurologic: A & O x4. CN 2–12 intact to testing. Strength is 5- out of 5 in bilat UE, RLE; 4 out of 5 in LLE. Intact reflexes at bilat triceps and biceps. Decreased reflexes bilateral patellar. **Labs:** WBC 10.1 Hb 8 / Hct 24.1 Plt 229 Na 142 K 5.9 Cl 109 CO2 20 BUN 64 Cr 5.2 Glc 83 Ca 12.7 Plasma protein 8.5 Albumin 5.0 Bilirubin 0.1 Alk phos 74 AST 14 / ALT 12 Phosphorus 6.2 Magnesium 2.3 HIV (–) TSH 2.14 A1c 5.2 % LDH 146 Ionized Ca 6.3 UA: 2+ protein, 1+ glucose, 1+ blood EKG: peaked T waves Kappa/Lambda FLC ratio 7684.21 (0.26–1.65) Kappa FLC 4380.00 (0.33–1.94) Lambda FLC 0.57 (0.57–2.63) 24 h urine protein 9226 (0–150) beta-2-Microglobulin 25.8 (1.1–2.5) MRI: Extensive malignant disease throughout the spine resulting in numerous compression fractures and involving the left iliac wing, left chest wall, left T9 rib, and paraspinal soft tissues. No spinal cord compression. Skeletal Survey: Extensive lytic lesions throughout the entire axial skeleton and the proximal two thirds of the humeri and femora. Multiple pathologic compression fractures throughout the thoracic and lumbar spine and an incomplete pathologic fracture of the left proximal humerus. Bone Marrow Biopsy: Plasma cells are increased (30 %). Flow cytometric analysis shows a monotypic, kappa-restricted plasma cell population (15 %) that is positive for CD56 and negative for CD20 and CD19. **Diagnosis:** Multiple Myeloma **Patient's course:** He was treated for elevated K and Ca emergently. His L humerus was immobilized in a sling. Renal biopsy showed cast nephropathy and he was started on sodium bicarb for acidosis. He received multiple blood transfusions and was started on cyclophosphamide, bortezomib and dexamethasone (CyBorD). He could not afford a SNF so he was discharged home after 4 weeks. As an outpatient, he received 3 more rounds of CyBorD. His creatinine improved to 2, and his kappa FLCs decreased from 4380 to less than 1. He underwent his first round of autologous hematopoietic stem cell transplant in Nov 2014.

DISCUSSION: Only 10 % of cases of multiple myeloma are diagnosed in individuals younger than 50, and only 2 % of cases in those younger than 40. Some of these cases are hereditary. The signs and symptoms of MM—anemia (73 %), bone pain (58 %), elevated creatinine (48 %), and fatigue (32 %)—are nonspecific, so a high index of suspicion is required to diagnosis multiple myeloma in the middle aged population. Most patients with MM initially present to their primary care provider, and delay in testing and diagnosis of MM leads to worse outcomes. Screening tests include SPEP+Immunofixation, UPEP+Immunofixation, serum free light chains, CBC, and CMP. Confirmatory tests include LDH, b2-microglobulin, bone marrow biopsy, and a skeletal survey. Treatment options include watchful waiting, chemotherapy and stem cell transplant. Younger patients with MM have a better prognosis than older patients.

AN UNCOMMON CAUSE OF SCANT PSEUDOHEMOPTYSIS Amy Chen, UCSF, San Francisco, CA. (Tracking ID #2198552)

LEARNING OBJECTIVE #1: Recognize the presenting symptoms of nasopharyngeal carcinoma (NPC).

LEARNING OBJECTIVE #2: Recognize extrapulmonary sources of bleeding when a patient presents with hemoptysis.

CASE: A 53 year-old Chinese woman with a history of hypertension presented to clinic for blood-tinged sputum. She developed a cough and bloody sputum in the setting of an upper respiratory tract infection 3 weeks prior to her visit. She continued to produce a pea-sized amount of bloody sputum every morning despite complete resolution of her cough. She denied fevers, chills, weight loss, hearing changes, nasal congestion, facial pain, dyspnea, chest pain, abdominal pain, changes in stool color. She is a lifetime nonsmoker. She was born in Hong Kong and lived there until she moved to the United States 20 years ago. Her head and neck exam was normal, she had no cervical lymphadenopathy, her lungs were clear to auscultation, and the remainder of her exam was unremarkable. Initial chest imaging was normal. Nasopharyngoscopy by ENT revealed a nasopharyngeal mass. A biopsy confirmed the diagnosis of nasopharyngeal carcinoma and additional imaging confirmed stage I disease.

DISCUSSION: In the US, the estimated incidence NPC is 0.5–2 per 100,000, whereas it is as high as 25 per 100,000 in Southeast Asia. Incidence of nasopharyngeal carcinoma remains high among people from endemic regions like Southern China and Hong Kong even after emigration but decrease with successive generations. The marked geographic and ethnic variation suggests an interplay of genetic, ethnic, and environmental factors. Patients often present with nonspecific head and neck symptoms and unfortunately, the majority of patients are found to have advanced disease at the time of diagnosis due to the propensity for lymphatic spread. A painless palpable neck mass is the most common presenting symptom (55 % in one study) and the diagnosis is then made after biopsy. Aural symptoms such as tinnitus, hearing loss, or recurrent serous otitis media are the second most common class of symptoms. Some patients present with sinus symptoms including epistaxis and recurrent rhinosinusitis. Epistaxis can be an overlooked source of bleeding and can be mistaken for hematemesis or hemoptysis, or in this case, pseudohemoptysis. Pseudohemoptysis is defined as expectorated blood that does not originate from the lungs or bronchial tubes. One study found that 10 % of patients who presented with hemoptysis were ultimately found to have an upper airway source of bleeding. Although a thorough history and physical can help distinguish true hemoptysis from pseudohemoptysis, in some cases, it is prudent to pursue a workup for both pulmonary and extrapulmonary sources of bleeding. NPC is rare in the United States but even in high risk regions, there are no guidelines for if and how to screen for NPC. However, experts recommend nasopharyngoscopy in the workup of new and recurring head and neck symptoms particularly in patients from Southeast Asia. In summary, this case reviews the pseudohemoptysis and other common presenting symptoms of nasopharyngeal carcinoma.

AN UNFORESEEN REACTION: A LESS COMMON CAUSE OF HYPERCALCEMIA Marlene Martin, Noriko Anderson, Sumant Ranji. University of California, San Francisco, San Francisco, CA. (Tracking ID #2195608)

LEARNING OBJECTIVE #1: Diagnose calcitriol-mediated hypercalcemia

LEARNING OBJECTIVE #2: Manage calcitriol-mediated hypercalcemia

CASE: A 52-year-old man with a history of Human Immunodeficiency Virus (HIV) and Hepatitis B (HepB) developed polyuria, polydipsia, nocturia, fatigue, and weight loss over a 2-month period. He attributed his symptoms to a change in his HIV medications and stopped his antiretrovirals (ARVs). He presented to a new primary care physician with acute kidney injury (AKI) to 2.18 mg/dL and hypercalcemia to 14.6 mg/dL, and was admitted for further workup and management. Hypercalcemia and AKI improved with intravenous fluids and pamidronate. Further workup revealed a suppressed parathyroid hormone (PTH) level of 3 ng/L and undetectable PTH related peptide (PTH-rP). 1,25(OH) vitamin D level was elevated at 128 pg/mL, with a normal TSH and cortisol level. There was no evidence of lymphoma or granulomatous disease on chest x-ray or computed tomographic (CT) scan of the chest, abdomen, and pelvis. Out of continued clinical concern for lymphoma, a PET scan was performed, which showed uptake in the patient's bilateral deltoid and buttock muscles. On further history, the patient admitted to injections of polymethyl methacrylate (PMMA) at these locations 5 years and 6 months prior to admission. These injections were performed for cosmetic reasons due to perceived muscle atrophy from HIV medications. Muscle biopsy showed chronic inflammation with histiocytes and a profuse foreign body giant cell reaction. Although frank granulomas were not found, the dense foreign body reaction was felt to explain his calcitriol-mediated hypercalcemia. The patient was treated with a course of prednisone, with resolution of hypercalcemia and improvement in his renal function.

DISCUSSION: Primary hyperparathyroidism and malignancy account for 90 % of the cases of hypercalcemia. While other etiologies are rare, they must be recognized because they can cause life-threatening hypercalcemia. Hypercalcemia greater than 13 mg/dL is usually malignancy associated. As our patient had both marked hypercalcemia and a history of HIV, a lymphoma needed to be ruled out. This led to a biopsy showing a foreign body reaction to PMMA injections. Calcitriol-mediated hypercalcemia is generally associated with granulomatous disorders. The granulomatous macrophage reaction produces PTH-independent calcitriol resulting in increased gut absorption of calcium and increased bone resorption. Although no granulomas were found, the histopathology of inflammation with giant cells has been found in other cases of calcitriol-mediated hypercalcemia due to foreign body reactions. In addition to treating the underlying disorder, treatment of calcitriol-mediated hypercalcemia encompasses reducing calcium intake, eliminating vitamin D supplements, and avoiding the sun. In some cases steroids and bisphosphonates are also warranted. Foreign body reactions to cosmetic injections can present as calcitriol-mediated hypercalcemia. To our knowledge this is the first case of PMMA injections causing such a reaction. Previous cases of calcitriol-mediated hypercalcemia have been reported in cosmetic paraffin oil and silicone injections.

AN UNUSAL CASE OF SATIN-INDUCED MYOPATHY Patrick Fadden²; Susan Wolver¹. ¹VCUHS, Richmond, VA; ²Virginia Commonwealth University, Chesterfield, VA. (Tracking ID #2195037)

LEARNING OBJECTIVE #1: Distinguish between statin induced myopathy and immune-mediated statin induced myopathy.

CASE: A 73 year old female with history of mitral valve stenosis requiring valve replacement presented to primary care clinic in May 2014 with sub-acute, progressive, painless, bilateral thigh weakness. She reported her weakness was first appreciated in 2010 after she suffered an elevated ST segment myocardial infarction (STEMI). Her cardiovascular function improved with rehabilitation but she reported her strength never returned to baseline. Her symptoms never interfered with daily activities and she maintained functionality in walking and using stairs. However, over the past 6 months she noted accelerated progression of thigh weakness so significant she required assistance in standing up and increased supervision while walking. She denied any associated pain or concerns for infection. Her other active medical issues included chronic atrial fibrillation, essential hypertension, and a multinodular goiter with negative FNA biopsy. Her pertinent medications included warfarin, tramadol, Lisinopril, metoprolol and Plavix. Simvastatin was initially added after her STEMI in 2010 but stopped in 2012. On exam, her vitals were within normal limits. She had 4/5 muscle weakness of her bilateral hip flexors with a delayed Timed Up and Go test. No atrophy, asymmetry, fasciculation or sensory deficits were observed. Labs revealed an elevated creatinine kinase (CK) at 709 U/L, normal ESR and TSH, and a negative ANA and anti-Jo. Neurology was consulted for assistance in evaluating her progressive myopathy. Over the next 4 months, her symptoms worsened and she demonstrated a persistent CK elevation of 500-700 U/L. EMG and muscle biopsy were deferred for concerns of bleeding due to mandatory anticoagulation. Screening labs for autoimmune and necrotizing myopathies were completed and all were normal with the exception of the HMG-CoA reductase IgG antibody which was positive at 3900 (reference <2400). In the setting of prior statin exposure and a remarkably negative work up, a positive HMG-CoA reductase antibody suggested evidence of an immune-mediated statin-induced myopathy.

DISCUSSION: Statin induced myopathy is a common adverse effect observed in up to 20 % of patients on statin therapy. Fortunately, symptoms are typically self-limited once the offending medication is discontinued. In contrast, immune-mediated statin-induced myopathy is a rare and serious complication from statin exposure and is characterized as a necrotizing myopathy with autoantibodies to the HMG-CoA reductase (HMGCR) receptor. The incidence of anti-HMGCR myopathy is estimated at 2 per million per year and can occur any time after exposure to statins. Clinical presentation is similar to statin induced myopathy with proximal muscle weakness and pain but often symptoms are more severe with persistent elevation in CK levels even after discontinuation of statin therapy. Distinguishing between these two statin induced myopathies is important as the autoimmune myopathy is treated with immunosuppressive therapy with either prednisone or immunoglobulin with or without methotrexate. This case was enlightening as she presented with progressive myopathy symptoms 2 years after discontinuation of statin therapy which highlights the sporadic nature of disease incidence. Statin use among Americans is at an all time high and likely to increase given the atherosclerotic cardiovascular risk guidelines developed by American College of Cardiology and the American Heart Association in 2013. Internists need to be aware of this rare and disabling autoimmune complication from statin exposure as the treatment differs vastly from general statin induced myopathy. Reference: Mohassel, P. and Mammen, A. L. (2013), Statin-associated autoimmune myopathy and anti-HMGCR autoantibodies. Muscle Nerve, 48: 477–483. doi: 10.1002/mus.23854

AN UNUSUAL ABDOMINAL MASS Migdalia Feliciano; Geeta Varghese. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2193938)

LEARNING OBJECTIVE #1: Recognize unusual causes of abdominal masses

LEARNING OBJECTIVE #2: Recognize atypical features of lipomas and other variants of benign adipose tumors

CASE: A 72 year old female with a 15 year old left lower quadrant mass presents to the office for acute changes in the mass. She never saw a physician for this mass and over the last year, the mass had increased in size, became itchy and started to burn. She also noted a second lesion in the left upper quadrant. Patient denied fever, chills, weight changes, trauma to area, abdominal pain or constipation. Physical exam was remarkable for a left lower quadrant mass that measured 10 cm x 8 cm and a left upper quadrant mass that measured 5 cm x 4 cm. Both masses were warm, non tender, non fluctuant and without erythema. Vital signs and lab results were normal. Patient's weight remained stable within the past year. Ultrasound was done which revealed a 6.1 x 2.0 x 4.5 cm well-circumscribed, fatty mass in the left upper quadrant without demonstrable vascularity at the junction of the subcutaneous fat and rectus muscle consistent with a lipoma. In the left lower quadrant, a 11.3 x 4.3 x 8.7 cm well-circumscribed, subcutaneous, soft tissue mass with an echo pattern characteristic of fatty tissue was found. However unlike most lipomas, this mass had increased vascular flow which corresponded to venous flow on spectral tracings. The left lower quadrant mass was consistent with a giant lipoma with atypical vascularity. Given the atypical vascularity of the left lower quadrant mass in the initial study, magnetic resonance imaging (MRI) abdomen and pelvis was completed, which revealed a 8.4 cm craniocaudal x 5.2 cm AP x 10.1 cm transverse left lower abdominal wall lipoma with mild increased vascularity along its anterior superior aspect and thin peripheral septations consistent with a giant lipoma, and a 4.0 cm craniocaudal x 1.8 cm AP x 5.4 cm transverse left upper anterior abdominal wall lipoma, without suspicious enhancement or nodularity. Surgery was consulted for excision and biopsy. Patient underwent excision of left upper and left lower quadrant lipomas. Pathology was consistent with lipoma. No recurrence to date.

DISCUSSION: Abdominal masses encompass a broad differential diagnosis, including various malignancies, abscesses, abdominal aortic aneurysm, organ enlargement and volvulus. Of these different possibilities, benign adipose tumors in the abdomen are rare. Differentiating the cause of the abdominal mass in our patient was initially difficult given her unusual history and physical. Her stable mass started growing, became pruritic, developed a burning sensation and the mass was warm to touch. These findings suggested vascularity or infection. Lipomas are not typically vascular which warranted further study with MRI and biopsy. There are three different types of benign adipose tumors including lipoma, hibernoma and angiolipoma. Lipomas are the most common benign adipose tumors with an estimated incidence of 10 %. Lipomas can be either superficial or deep tissue. Eighty percent of superficial lipomas are less than 5 cm and located most commonly on the trunk, shoulder, upper arm and neck. Deep lipomas commonly occur in the chest wall and the deep soft tissues of the hands and feet. Rarely do they occur in the retroperitoneum. In comparison to superficial lipomas, deep tissue lipomas are less well defined and are larger in size. Giant lipomas are located in deep body planes and are at least 10 cm in one dimension. Lipomas are typically solitary lesions. The majority of lipomas gradually increase and then remain stable in size. They usually are asymptomatic, although pain, tenderness or compression of peripheral nerves can be present in up to 25 % of patients. Imaging for lipomas in atypical locations include ultrasonography, computed tomography (CT) scan and magnetic resonance imaging (MRI). Lipomas can be treated with nonexcisional techniques such as steroid injection and liposuction, as well as enucleation and excision. Indications for surgical excision of presumed lipomas include a mass greater than 5 cm, a tumor that is growing, a tumor deep to the deep fascia, concerning clinical features such as irregularity, rigidity or pain or a patient's cosmetic concern. Other benign adipose tumors include hibernoma and angiolipoma. Angiolipoma, a lipoma variant, contains mature fat cells, small vessels and capillaries. They are often multiple tumors commonly located in the arms and trunk. The ideal treatment of angiolipoma is surgical resection. Hibernoma is a rare benign, highly vascular adipose tumor composed of brown fat cells. They account for 1.6 % of benign adipose tumors. The most common location is the thigh, followed by the shoulder, back, head and neck. Surgical excision is the treatment of choice for hibernomas. Although, giant lipomas are rare in the abdominal cavity, they should be considered in the differential for abdominal masses.

AN UNUSUAL CASE OF ACUTE PULMONARY EMBOLISM PRESENTING WITH ST ELEVATION AND APICAL BALLOONING SYNDROME Deepthi Sudhakar¹; Jason Pelton¹; Holly Bentz¹; William Posligua¹; Don Pham¹; Mostafa O. El-Refai¹; David Paniagua²; Hani Jneid²; Ali Denktas². ¹Baylor College of Medicine, Houston, TX; ²Michael E. DeBakey VA Medical Center, Houston, TX. (Tracking ID #2195821)

LEARNING OBJECTIVE #1: Recognize acute pulmonary embolism as a cause of apical ballooning syndrome

CASE: Our patient is a 61 year old caucasian female with no significant past medical history who developed acute hypoxic respiratory failure while undergoing prolonged inpatient mental health treatment for suicidal ideation. The hospital's rapid response team was immediately activated. Initial assessment revealed a heart rate of 122 beats per minute, respiratory rate of 30, blood pressure of 141/77 mmHg, and oxygen saturation of 72 % on room air. Physical exam showed an unresponsive female in severe respiratory distress. Cardiopulmonary exam revealed regular tachycardia with no audible murmurs or gallops with clear lungs and absent jugular venous distension. Electrocardiogram showed ST elevation in anteroapical leads and the STEMI pager was activated. Laboratory findings were significant for elevated troponin I (0.05), CK-MB (14.7), CK (2647). The patient was subsequently started on unfractionated heparin and loaded with clopidogrel for treatment of acute coronary syndrome (ACS) and taken urgently for coronary catheterization. On arrival to the catheterization lab she went into cardiac arrest was emergently intubated for airway protection. Return of spontaneous circulation was achieved after 2 min of advanced cardiac life support (ACLS). Subsequent coronary angiography revealed normal coronary anatomy without obstruction; left ventriculogram was also performed and was significant for apical ballooning consistent with apical ballooning syndrome (APS). The mean pulmonary artery pressure was measured at 38 mmHg, consistent with pulmonary arterial hypertension. Transthoracic echocardiogram showed a severely dilated right ventricle and severe right ventricular systolic dysfunction concerning for acute pulmonary embolism. Chest X-ray was unremarkable. Computed tomography confirmed emboli in the left and right main pulmonary arteries with extension into the upper and lower lobe branches. Given hemodynamic instability and high oxygenation requirements, she was given 100 mg of systemic tPA with significant improvement in oxygenation. Troponin I peaked at 9.10 while CKMB and CK peaked at 30.6 and 3847 respectively. Lower extremity venous ultrasound subsequently showed a subacute occlusive thrombus in the left popliteal vein. She was transitioned from unfractionated heparin to low molecular weight heparin and started on warfarin for treatment of DVT/PE. Our patient improved significantly over the next few days and was successfully weaned off ventilator support and extubated. Due to our patient's extensive thrombus burden and risk of recurrent emboli and hemodynamic collapse, the decision was made to place an IVC filter. Repeat transthoracic echo was performed which showed mild improvement in right ventricular function with normal left ventricular ejection fraction. The remainder of her hospital course was unremarkable without any sequelae of heart failure or pulmonary hypertension.

DISCUSSION: Apical ballooning syndrome (APS), also known as Takotsubo cardiomyopathy or Broken Heart Syndrome, is a reversible stress-induced cardiomyopathy characterized by transient left ventricular (LV) apical ballooning and basal hyperkinesis. Predominantly seen in postmenopausal women, it presents with features of an acute myocardial infarction the absence of obstructive coronary artery disease or history of heart failure. Angina and dyspnea are the most common presenting symptoms but APS can also manifest as acute pulmonary edema, cardiogenic shock, ventricular tachyarrhythmias, and sudden cardiac death. APS is clinically indistinguishable from acute myocardial infarction and it is estimated that APS makes up approximately 2 % of acute coronary syndromes. While it is commonly linked to physical or emotional stressors, precipitating factors, particularly physical, remain challenging to identify and are unknown in one-third of cases. Our case is unique in the fact that although acute pulmonary embolism is a recognized cause of APS, there are only isolated case reports in the literature. The pathophysiological mechanism remains unknown, but is thought to be related to a stress-induced catecholamine surge and subsequent increase in sympathetic activity. While there lacks a consensus for diagnostic criteria for APS, guidelines proposed by the Mayo Clinic can provide diagnostic utility. Our patient satisfied all four criteria, including transient apical akinesis, ECG abnormalities, absence of obstructive coronary artery disease, pheochromocytoma, intracranial hemorrhage, and myocarditis. Prognosis for APS is excellent with low in-patient mortality and most patients recovering completely within days to months. In addition, although our patient presented with ST elevation on ECG, her clinical presentation was most consistent with pulmonary embolism. This case highlights the importance of recognizing pulmonary embolism and as a cause for APS with ST elevation.

AN UNUSUAL CAUSE OF DIARRHEA IN A YOUNG ADULT, EOSINOPHILIC COLITIS Andrew W. Hahn¹; Jamie Riney¹; Rebekah Mulligan¹; Kanak Das². ¹The University of Tennessee Health Science Center, Old Hickory, TN; ²The University of Tennessee Health Science Center, Memphis, TN. (Tracking ID #2182630)

LEARNING OBJECTIVE #1: Diagnose eosinophilic colitis based upon the triad of clinical, laboratory, and histological findings.

LEARNING OBJECTIVE #2: Treat eosinophilic colitis by distinguishing among the different etiologies of eosinophilic colitis.

CASE: The patient is a 27 year-old Caucasian male who presented to the ED with a chief complaint of diarrhea of 1-week duration. He had 10-15 watery, non-bloody bowel

movements per day with associated “crampy” RLQ abdominal pain unrelated to food or bowel movements. Upon questioning, he recently traveled to Costa Rica and had no family history of inflammatory bowel disease. Of note, he saw a gastroenterologist 2 days prior where he underwent a colonoscopy with multiple biopsies performed. Initial evaluation revealed a male in mild distress with stable vital signs. He had diffuse tenderness to palpation of his abdomen worst in the RLQ without rebound tenderness, and a rectal exam showed brown stool with a negative stool guaiac. Complete blood count (CBC) was significant for leukocytosis of 10.7 billion cells/L with 26 % eosinophils and 14 % bands, while remaining labs were unremarkable. The patient was admitted for evaluation of his diarrhea in the context of an elevated peripheral eosinophilia. Laboratory tests for parasitic infections and autoimmune conditions were negative. Stool cultures were positive for salmonella. Biopsy results from the colonoscopy revealed right colonic mucosa with preserved crypt architecture, brisk eosinophilic infiltrate in the lamina propria with greater than 100 eosinophils per high-power field (HPF), patchy mild neutrophilic cryptitis, and no parasitic elements. He was diagnosed with eosinophilic colitis. The patient’s salmonella infection was treated with levofloxacin for 7 day. His symptoms completely resolved 1 day after discharge and did not recur in the first month from discharge.

DISCUSSION: Eosinophilic colitis (EC) is one of the eosinophilic gastrointestinal disorders (EGID) along with eosinophilic esophagitis and gastroenteritis. EC is the least common of the EGIDs and has a bimodal distribution affecting infants and young adults. EC can be primary or secondary to numerous causes including parasitic infections, inflammatory bowel disease, and others as listed in Table 1. The disease has three hallmarks in its presentation: peripheral eosinophilia (5–35 %), segmental eosinophilic infiltration of the colon, and clinical symptoms that correlate to the layer of the colon affected. Colonoscopy findings in EC are non-specific, so biopsy is required to demonstrate the presence of eosinophils in a layer of the colon. While no consensus exist, EC is usually diagnosed between 15 and 25 eosinophils/HPF dependent upon the segment of the colon biopsied. The natural course of the disease is undefined, but treatment often begins with discontinuation of contributing medications and treatment of any parasites present. Then, clinicians can treat with a course of either corticosteroids or 5-aminosalicylic acid if needed.

AN UNUSUAL CAUSE OF HEART FAILURE -LEFT VENTRICULAR NON-COMPACTION Diana Purushotham; Nunzio Gaglianelli; Kurt J. Pfeifer. Medical College of Wisconsin, Milwaukee, WI. (Tracking ID #2195223)

LEARNING OBJECTIVE #1: Recognize left ventricular non-compaction(LVNC) as an etiology for new-onset heart failure in young patients

LEARNING OBJECTIVE #2: Review the unique diagnostic treatment options and medical complications associated with LVNC

CASE: A 29-year-old male with a history of severe systolic dysfunction presented with clinical symptoms of heart failure. At the age of 22 he was admitted for a gunshot wound and incidentally found to have severe systolic dysfunction with a left ventricular ejection fraction of 20 %. He underwent a left heart catheterization that revealed normal coronary arteries. He did have a history of substance abuse (a bottle of wine twice a month for “many years”, and occasional cocaine use). The patient subsequently had an implantable cardiac defibrillator (ICD) placed, but the etiology of his heart disease remained unknown. During this hospital admission he was diagnosed and treated for congestive heart failure exacerbation secondary to medication and diet non-compliance. He had a repeat transthoracic echocardiogram that showed trabeculations and a larger region of non-compacted myocardium compared to compacted myocardium consistent with a diagnosis of left ventricular non-compaction (LVNC). The echocardiogram also noted possible thrombus within the trabeculations, which is a known complication of this disease. He was aggressively diuresed and was continued on atorvastatin, carvedilol, lisinopril, spironolactone and lasix. Given the possible ventricular thrombus he was started on lifelong warfarin.

DISCUSSION: LVNC is a disease thought to be caused by early cessation of the compaction process during the 12th to 18th week of embryogenesis. As a result individuals with LVNC have a larger proportion of non-compacted to compacted myocardium, which increases the risk for development of severe left ventricle dilatation. As a result, they are more prone to heart failure, arrhythmias, sudden cardiac death, strokes, and limb ischemia. The diagnosis of this disease is made by either transthoracic echocardiogram or cardiac MRI. LVNC has an autosomal dominant mode of inheritance although sporadic cases have been reported. Patients should be managed according to the current guidelines for heart failure. This includes being treated with a beta blockers, statin therapy, renin-angiotensin blockade and aldosterone antagonists. The unique medical management for this disease includes consideration for anticoagulation given the higher risk for thromboembolism, as well as genetic testing for family members. LVNC is a rare disease, and should be considered in young patients with heart failure. The prognosis of this disease is poor, with many patients requiring heart transplantation.

AN UNUSUAL CAUSE OF UNILATERAL VISION LOSS IN A YOUNG FEMALE Kymberly E. McDonald^{1, 2}; John Vischio². ¹University of Connecticut, Wethersfield, CT; ²Hartford Hospital, Hartford, CT. (Tracking ID #2198088)

LEARNING OBJECTIVE #1: To keep a broad differential of etiologies causing sudden unilateral blindness in patients with seemingly negative initial work up.

LEARNING OBJECTIVE #2: Early diagnoses and recognition of disease etiology decreases morbidity by allowing targeted pharmacotherapy.

CASE: A 19 year old African-American female with no significant past medical history presented to the Emergency Department complaining of sudden onset left sided blindness. She had noted some blurred vision associated with a left sided headache the week prior to presentation, however, denied any focal weakness, changes in speech, or diplopia. She also noted some photosensitivity and eye pain over the same time period. Her vital signs were within normal limits. Review of systems was pertinent for reports of chronic dry eyes. Physical exam was only notable for decreased vision at one to two feet, however the remainder of the neurological exam was unremarkable. Initial laboratory data showed a white blood cell count of 7.1, normal chemistry panel, ESR 6, and a moderately elevated CRP at 4.3. Vitamin B12 and folate levels were WNL. Patient underwent an MRI of the orbits which showed enlargement and diffuse enhancement of the optic nerve from the left globe to the level of the optic chiasm consistent with acute left optic neuritis. Further work up included a lumbar puncture; cerebral spinal fluid was negative for Lyme antibody and HSV. There were no CSF oligoclonal bands, and cell count, protein, and glucose were all within normal limits. Neuromyelitis Optica testing was also found to be negative. She was initially treated as a new onset multiple sclerosis flare with high dose corticosteroids and discharged to home after some improvement in her vision. Further outpatient work up included a negative ANA, negative ANCA serologies, negative SCL-70, and negative rheumatoid factor. A PET scan was performed which showed increased uptake in her bilateral parotid and sublingual glands. She was then referred to Rheumatology where further work up revealed negative Ro (SSA), however positive La (SSB) antibodies at a level of 58. Due to the paucity of other symptoms or laboratory markers consistent with rheumatologic disorders, she then underwent a lip biopsy which showed >4 foci of >50 lymphocytes consistent with sialadenitis. A diagnosis of Sjögren’s Syndrome was made based on the positive La antibody and the lip biopsy results.

DISCUSSION: Sjögren’s syndrome (SS) is a chronic autoimmune inflammatory disorder characterized by diminished lacrimal and salivary gland function. Several established criteria are in place in order to diagnose SS, however caution must be taken in patients who test positive only for SSA or SSB antibodies; in those cases, a lip biopsy is warranted to confirm diagnoses and start appropriate pharmacotherapy. Central nervous system manifestations are rare and may mimic other autoimmune or neurologic diseases including multiple sclerosis and therefore proper diagnosis is key. Treatment typically includes corticosteroid treatment, however if the disease consists of continued progressive CNS destruction, monthly intravenous Cyclophosphamide for six to twelve months, or until stabilization or improvement is seen, has been recommended.

AN UNUSUAL PRESENTATION OF GOUT Saki Miwa. Baystate Medical Center, Springfield, MA. (Tracking ID #2196807)

LEARNING OBJECTIVE #1: Recognize cervical gout as a possible cause of severe neck pain.

LEARNING OBJECTIVE #2: Recognize the importance of history-taking in patients with severe neck pain.

CASE: A 74 year-old woman with history of coronary artery disease, diabetes, hypertension, hyperlipidemia, and bilateral breast cancer for which patient did not complete full chemotherapy regimen, presented to the Emergency Department (ED) with one month history of worsening posterior neck pain. She described the pain as radiating from her left jaw to left temple, constant but worse with movement of the neck, and associated with dizziness. She had visited the ED a month prior, where she underwent a CT of the spine w/o contrast which did not reveal any significant abnormalities, and she was discharged home. The neck pain initially improved but returned with more intensity several days prior to her second visit. Patient appeared to be in severe pain. Full neurological was exam normal, including strength and reflexes. Labs showed iron-deficiency anemia and elevated sedimentation rate (>130 mm/hr) but otherwise unremarkable. A routine chest x-ray revealed new 19 mm opacity in the left upper lung and a chest CT confirmed the presence of an irregular, spiculated mass in left upper lobe with lymphadenopathy, highly concerning for malignancy. An extensive work up was performed including: MRA of head and neck which was negative for stroke or arterial dissection; and MRI of cervical spine (with and w/o contrast) which was negative for metastatic lesion. However, the latter showed T1 and T2 hypointense soft tissue associated with the dens as well as craniocervical and C1-C2 articulations, which correlates with hyperdense and mineralized soft tissue related to the dens with multiple bony erosions, overall strongly suggestive of

gout. Further review of the patient's medical history revealed a prior history of gout, although never confirmed with joint aspirate, of her wrist 10 years prior. A uric acid level checked 1 year ago was 7.2 mg/dL. She was not on any long-standing gout treatment. Patient was treated symptomatically colchicine and oxycodone. With this treatment, her symptoms improved and her pain had nearly resolved 2 weeks later. Outpatient biopsy of the lung nodule showed features consistent with metastatic breast cancer, and patient has refused chemotherapy, electing for watchful waiting. Over the next 6 months, patient has had another episode of cervical gout (diagnosed based on symptoms) as well as gout in her wrist.

DISCUSSION: This case illustrates that although unusual, gout may be considered in the differential diagnosis of neck pain and the importance of a detailed history for diagnosis. In this case, the finding of a possible lung malignancy made bony metastases a major concern requiring extensive work-up. The lack of any recent gouty attacks and a relatively normal uric acid level made gout seem unlikely. However, studies suggest that cervical gout may be more common than expected. Although it would be unreasonable to expect cervical gout in all cases of severe neck pain, consideration should be given in light of past medical history. In addition, this case also touches upon the possible relationship that has been observed between gout and malignancy.

AN UNUSUAL SITE OF AVASCULAR NECROSIS IN A PATIENT WITH SICKLE CELL PAINFUL CRISIS Adnann Polani; Faran Polani; Pradeep Joseph, marshfield clinic, Marshfield, WI. (*Tracking ID #2153253*)

LEARNING OBJECTIVE #1: Patients with sickle cell painful crisis may present with musculoskeletal complications like avascular necrosis and osteomyelitis.

LEARNING OBJECTIVE #2: Although the areas most frequently affected are cortical bone of the acetabulum, the head of the femur, and the head of the humerus, occasionally unusual skeletal sites can be involved. In the setting of skeletal pain, a thorough and detailed musculoskeletal exam with high index of suspicion for these potential complications is hence recommended.

CASE: A 24 years old African American inmate with known history of sickle cell disease presented with back pain and generalized weakness that was consistent with his prior episodes of painful sickle cell crisis. However this time he also had an unusual pain over his collar bone. No fevers or chills were reported. There was no history of trauma. His physical exam except for the musculoskeletal system was unremarkable. There was fullness and exquisite tenderness over the medial aspect of right supraclavicular fossa. There was also significant tenderness over the right sternoclavicular joint and the medial aspect of the right clavicle, however there was no redness or warmth. Laboratory studies revealed a hemoglobin level of 9 g/dl which was close to patient's known baseline. Reticulocyte count, renal functional studies and venous lactate levels were normal. Mild leukocytosis and moderate elevation of inflammatory markers were noted. X-ray showed no fractures. The patient was treated with Intravenous fluid hydration, narcotics and empiric antibiotics for suspicion of avascular necrosis and possible osteomyelitis or septic arthritis. MRI within 24 h showed prominent bone marrow edema, periostitis, and surrounding soft tissue edema of the medial right clavicle, without discrete fracture or definitive evidence of osteomyelitis. In the proper clinical context the findings were suggestive of avascular necrosis. Subsequent blood cultures were negative. Antibiotics were discontinued and patient continued to improve with conservative therapy of Intravenous fluid hydration and pain control.

DISCUSSION: Avascular necrosis of bone is a common problem in patients with sickle cell disease however the areas most frequently affected are cortical bone of the acetabulum, the head of the femur, and the head of the humerus. There are case reports of avascular necrosis affecting other bony structures or joints, including the mandibular condyle and temporomandibular joint and the elbow, though the incidence and prevalence of involvement of these sites is unknown. Our survey of the literature however did not identify any reported case of avascular necrosis of the sternal end of clavicle secondary to sickle cell crisis. Given the early decrease in splenic function in sickle cell disease, bacterial super infection especially in the setting of osteonecrosis is not uncommon. Moreover it can be challenging to differentiate osteomyelitis and septic arthritis from osteonecrosis/avascular necrosis based on imaging and clinical features alone. Early diagnosis and high level of suspicion for musculoskeletal complications in a patient with sickle cell crisis is hence crucial.

AN UNUSUAL TUBERCULOSIS CASE Binyue Chang, Berkshire Medical Center, Pittsfield, MA. (*Tracking ID #2159575*)

LEARNING OBJECTIVE #1: Utilize proper diagnostic method in patient with unusual presentation of tuberculosis

CASE: A 62-year-old Caucasian male presented to emergency room (ER) for shortness of breath and nonproductive cough for a month. He smokes half a pack of cigarettes per day

for 40+ years. He works as a painter and repairman for nursing homes in recent years, during which he has negative tuberculin skin test (TSTs) to date. He is a regular blood donor with negative HIV infection. He was born and raised in the United States (US) and has never traveled abroad. At ER, patient's chest x ray showed bilateral predominantly right lung infiltrate and right middle lung nodule. He was discharged to home with 5-day Azithromycin. Despite antibiotic treatment, he started to have purulent sputum production. His follow-up CT chest ordered by primary care provider (PCP) in 1 month revealed irregular outlined well-circumscribed nodules with a cavitary lesion of right upper lobe. His PCP ordered TST and referred him to lung nodule clinic to be evaluated by thoracic surgery. TST turned out to be negative. After reviewing his CT imaging, pulmonary recommended QuantiFERON assay (an interferon- γ release assay used in tuberculosis diagnosis). When the QuantiFERON assay was positive, patient was admitted and bronchoscopy was performed. Bronchoscopy washings were sent for acid-fast bacillus (AFB) smear and culture. Initially, AFB smear did not detect mycobacteria. However, nuclear acid amplification test (NAAT) performed at the state lab was positive, confirming TB infection. Subsequently, sputum culture and bronchial washings culture turned out to be positive and this confirmed that he has active *Mycobacterium tuberculosis* (TB).

DISCUSSION: TB is one of the most debilitating diseases in the world. With more than two billion people infected by TB, it creates a huge economic and healthcare burden worldwide. In US, the rate of TB has declined to 3.0 cases per 100,000 inhabitants in 2013. Since there is a less alarming rate of TB infection in US, physicians may be less vigilant, especially when encountering US-born patients with negative TST. Interferon- γ release assay (IGRAs) are blood test that measures T cell release of Interferon-gamma followed by TB stimulation in vitro. The United States Centers for Disease Control and Prevention (CDC) 2010 guidelines indicate that IGRAs can be used in place of TST for diagnosis of TB. NAAT can reliably detect *Mycobacterium tuberculosis* bacteria in specimens 1 or more weeks earlier than culture and confirms rapidly the presence of *M. tuberculosis* in 50–80 % of AFB smear-negative, culture-positive specimens. When physicians are suspecting TB infection in TST negative patients, IGRAs and NAAT are reliable tests to order.

ANCA-ASSOCIATED RENAL-LIMITED VASCULITIS PRESENTING ATYPICALLY AS NONOBSTRUCTIVE HYDRONEPHROSIS Sarah Chuzy¹; Courtney Tuegel²; Bijal Jain^{3, 1}. ¹Northwestern University, Chicago, IL; ²Feinberg School of Medicine, Northwestern University, Chicago, IL; ³Jesse Brown VA, Chicago, IL. (*Tracking ID #2196728*)

LEARNING OBJECTIVE #1: Identify the different ANCA-associated vasculitides and the challenges in classification and diagnosis

LEARNING OBJECTIVE #2: Recognize nonobstructive hydronephrosis as an atypical presenting sign of ANCA-associated vasculitis

CASE: A previously healthy 68-year-old male presented to his primary doctor with 2 months of diffuse abdominal pain, fatigue, and a 30-lb weight loss. Workup revealed significant acute kidney injury (AKI), prompting admission. He had no urinary complaints and reported normal urine appearance and output. The rest of his history and examination was unremarkable. Serum creatinine (Cr) was 5.2 mg/dl, up from 1 mg/dl 2 months prior. Urinalysis revealed microscopic hematuria, sterile pyuria, proteinuria, and no casts. An abdominal CT-scan showed bilateral hydronephrosis with retroperitoneal lymphadenopathy along the right ureter, but no clear source of obstruction. Bilateral ureteral stents were placed without improvement in the Cr. Percutaneous nephrostomy tubes were subsequently placed with only modest improvement in the kidney function. Meanwhile, workup sent for weight loss and constitutional symptoms revealed a negative anti-nuclear antibody, mildly elevated rheumatoid factor, unremarkable workup for multiple myeloma, a markedly elevated erythrocyte sedimentation rate (108 mm/hr), and a positive cytoplasmic antineutrophil cytoplasmic antibody (c-ANCA). Given these findings, a renal biopsy was obtained, which showed crescentic glomerulonephritis, interstitial nephritis, and tubulitis, all consistent with a diagnosis of pauci-immune ANCA-associated vasculitis. The patient received 7 days of plasmapheresis, 3 days of pulse methylprednisone, and was started on maintenance cyclophosphamide and prednisone.

DISCUSSION: The diagnosis and classification of the ANCA-associated vasculitides (AAVs), which include granulomatosis with polyangiitis (GPA), microscopic polyangiitis (MPA), eosinophilic granulomatosis with polyangiitis (EGPA), and renal-limited vasculitis (RLV), is challenging as there are no well-validated classification schemes. Further, there is substantial overlap in clinical features among the AAVs and patients often fall on a continuum. Likewise, renal histopathology is quite variable within the AAVs and there is similar overlap among the vasculitides. For example, while pauci-immune crescentic necrotizing glomerulonephritis is the hallmark histologic lesion, glomerulosclerosis, interstitial fibrosis, tubular atrophy, and interstitial nephritis have all been described in the literature. No lesion, however, is shown to be specific for any diagnostic subgroup. Our patient had a positive c-ANCA and renal biopsy consistent with ANCA glomerulonephritis. However, he lacked the classic extrarenal manifestations of GPA, MPA, or EGPA. Thus, based on current

classification schemes, our diagnosis is renal-limited vasculitis. There are, however, case reports describing patients who initially presented with isolated pauci-immune glomerulonephritis but developed diagnostic extrarenal lesions later in their courses. In light of this, our patient's diagnosis remains subject to change. Importantly, this case represents an atypical presentation of renal vasculitis as hydronephrosis. There are case reports of GPA presenting as obstructive hydronephrosis from granulomatous inflammation of the peri-ureteral vessels or involvement of the ureter. Our patient did have narrowing of the right ureter at the level of the iliac vessels. However, since there was no improvement in kidney function after decompression, the hydronephrosis was nonobstructive. Lillaz and colleagues described a similar case in 2011 of GPA presenting with hydronephrosis on imaging. As in our case, the patient's Cr failed to improve with decompression, prompting kidney biopsy and subsequent discovery of AAV. In both cases, the underlying vasculitis caused the AKI, not obstruction. Physicians, thus, should be aware of hydronephrosis as an atypical presenting feature of AAVs and consider ANCA testing and renal biopsy in patients with AKI and hydronephrosis, particularly if decompression fails.

ANOTHER TYPE OF SICKLE CELL PAIN CRISIS Claire A. Evans²; Madeline E. Petty²; Thomas Montgomery¹. ¹Carolinas Healthcare System, Charlotte, NC; ²Carolinas Medical Center, Charlotte, NC. (Tracking ID #2200151)

LEARNING OBJECTIVE #1: Recognize hepatic sequestration crisis and acute sickle hepatic crisis as sequelae of sickle cell disease which are distinguished by clinical and laboratory findings.

LEARNING OBJECTIVE #2: Treat sickle cell patients with preoperative transfusions to prevent postoperative sickle cell crises, including hepatic sequestration crisis and acute sickle hepatic crisis.

CASE: A 19-year-old African American man with history of homozygous sickle cell (SS) disease underwent removal of an obstructed common bile duct stent and elective laparoscopic cholecystectomy at an outside hospital. Postoperatively, he developed severe right upper quadrant pain, anorexia, and fever to 103 °F. Serologic testing revealed a total bilirubin of 13.1 mg/dL, alkaline phosphatase of 98 IU/L, alanine aminotransferase (ALT) of 815 IU/L, aspartate aminotransferase (AST) of 697 IU/L, reticulocyte count of 23,000/microL, and lipase of 13 IU/L. His hemoglobin dropped from 8.2 g/dL to 7.0, then to 5.4. Given his continued severe pain, laboratory abnormalities, and dropping hemoglobin, he was transferred to our hospital for further treatment. On admission, patient was tachycardic and febrile with leukocytosis of 32,000/microL. His liver edge was palpable 1 cm below the right costal margin. Differential diagnosis included retained common bile duct stone, cholangitis, necrotizing pancreatitis, hepatic sequestration crisis, acute sickle hepatic crisis, or shock liver. Given his critical condition and rapidly dropping hematocrit consistent with hepatic sequestration crisis, exchange transfusion was deemed necessary and he was transfused 12 units packed red blood cells. His hemoglobin increased from 5.0 to 9.5. His percentage of hemoglobin S decreased from 60 to 14.9 %. For the remainder of his hospitalization, his pain improved substantially, vital signs stabilized, and hemoglobin was stable at 9.4.

DISCUSSION: As is true in other organ systems, the liver is susceptible to damage due to the sickling process. Two conditions associated with acute sickling are acute sickle hepatic crisis and hepatic sequestration crisis. The pathogenesis of acute sickle hepatic crisis is hypothesized to involve ischemia caused by sinusoidal obstruction. On the other hand, hepatic sequestration crisis is thought to be due to large numbers of sickled red blood cells acutely sequestered in the liver, similar to splenic or pulmonary vascular sequestration crises. Both of the described liver conditions can present with jaundice, right upper quadrant pain, and hepatomegaly. The key to determining the difference between the two is evaluating specific clinical and laboratory findings. Acute sickle hepatic crisis physical exam findings include nausea and low grade fever. Important laboratory values include increased concentrations of ALT and AST. Although there are some cases of levels over 1000 IU/L, aminotransferase levels rarely exceed 300 IU/L. Additionally, the serum total bilirubin concentration is usually elevated but not by more than 15 mg/dL. Conversely, hepatic sequestration crisis is associated with rapidly increasing hepatomegaly. Laboratory tests reveal falling hematocrit, often inversely related to the increase in liver size. Liver function tests are usually not affected. Eventually, continued sequestration can lead to shock and death. Treatment differs for the two conditions. While acute sickle hepatic crisis can be treated with intravenous fluids and analgesia, hepatic sequestration treatment can be more involved. Sometimes, simple transfusion therapy is sufficient to decrease the symptoms of anemia. One unit of blood may be enough to release blood that was previously sequestered in the liver back into circulation and thus cause autotransfusion. However, in extreme cases such our patient with acutely dropping hemoglobin, exchange transfusion may be necessary. The perioperative period is associated with increased risk of complications for patients with sickle cell disease. The current standard of care for patients with SS disease undergoing general anesthesia and surgery is to preoperatively be transfused to a hemoglobin level of 10 g/L to prevent precipitating a crisis. Importantly, however, there is ongoing debate in the literature regarding this issue. Some small nonrandomized studies of sickle cell patients undergoing laparoscopic

cholecystectomy showed no clinical benefit from preoperative transfusion. Conversely, the TAPS randomized controlled trial of patients undergoing medium-risk surgery ($n=343$) showed that preoperative transfusions were associated with decreased risk of clinically important and severe complications. Also, in another study of 364 sickle cell patients undergoing cholecystectomy, the incidence of sickle cell events was lower in patients who were transfused preoperatively. For our patient, it is worth wondering if his hepatic sequestration crisis may have been avoided had he been pre-transfused prior to his cholecystectomy.

ANTI-ERYTHROPOIETIN ANTIBODY ASSOCIATED PURE RED CELL APLASIA RESOLVED AFTER LIVER TRANSPLANTATION: A CASE REPORT Annie K. Hung; Jennifer Guy; Caroline Behler; Eugene Lee. California Pacific Medical Center, San Francisco, CA. (Tracking ID #2194743)

LEARNING OBJECTIVE #1: Patients undergoing antiviral therapy for chronic hepatitis C often develop anemia secondary to ribavirin, which causes dose dependent hemolysis, and interferon, which causes bone marrow suppression. Dose reductions of antivirals secondary to anemia are common and have been shown to be associated with decreased rates of sustained virological response. To improve anemia associated with antiviral therapy and to minimize dose reductions, erythropoiesis stimulating agents have been used. Rarely, patients can develop anti-erythropoietin antibodies which also have neutralizing capacity for endogenous erythropoietin. It is important to consider this complication in patients undergoing antiviral therapy when they develop severe anemia refractory to erythropoiesis stimulating agents.

LEARNING OBJECTIVE #2: Because of the rarity of this anemia, there have been no randomized controlled trials to date and there are only limited treatment recommendations which are immediate cessation of erythropoiesis stimulating agents and initiation of immunosuppression. Reports have documented full clinical recovery in patients treated with various immunosuppressive therapies including corticosteroids, cyclophosphamide, intravenous gamma globulin, cyclosporine, mycophenolate mofetil, and rituximab. In chronic kidney disease patients who received recombinant erythropoietin for anemia support and then developed anti-erythropoietin antibody associated pure red cell aplasia, there have been good outcomes associated with renal transplant and subsequent immunosuppression.

CASE: This report describes a 66 year old African American man with chronic hepatitis C and associated hepatocellular carcinoma who underwent treatment with ribavirin, pegylated interferon, and telaprevir while awaiting liver transplantation for the indication of hepatocellular carcinoma. Shortly after initiation of treatment, he developed anemia and was started on epoetin alfa. After 5 months, he continued to be anemic despite an increased dose of epoetin alfa and started requiring blood transfusions of two to three units of packed red cells every three to four weeks to keep hemoglobin above 7.0 g/dL. After dose reduction and then subsequent discontinuation of all antiviral therapy, his anemia did not improve. He underwent a thorough work up of his anemia and was found to have pure red cell aplasia from high titer neutralizing anti-erythropoietin antibodies at 21.4 mcg/mL. Bone marrow biopsy showed hypocellularity with trilineage hematopoiesis, without increase in blasts. Four weekly treatments of rituximab 375 mg per m² did not improve his transfusion dependent anemia. Subsequently, the patient underwent orthotopic liver transplantation for hepatocellular carcinoma without any complications. Chronic immunosuppression was initiated with prednisone, mycophenolate mofetil, and tacrolimus. In 10 weeks, he achieved hemoglobin greater than 10.0 g/dL. He has not required any more blood products with his last transfusion being 2 weeks post transplant. He was started on iron chelation therapy for iron overload, likely secondary to chronic transfusions.

DISCUSSION: Most of the research on anti-erythropoietin antibody associated pure red cell aplasia has focused on patients with chronic renal disease. The immunological mechanism behind this severe and often transfusion dependent anemia has yet to be elucidated and warrants further exploration. There is also limited data regarding outcomes of this entity in the setting of liver disease and liver transplant. In this case, a chronic liver disease patient developed anti-erythropoietin antibody associated pure red cell aplasia, and recovered after liver transplantation and three drug immunosuppression. It is unclear whether it is the transplanted organ, the subsequent immunosuppression, or a combination of both that contributed to the hematological response. In conclusion, anti-erythropoietin antibody associated pure red cell aplasia is a serious complication of recombinant erythropoietin therapy that necessitates prompt recognition and treatment, but this entity should not be considered a contraindication for solid organ transplantation.

ANTIBODIES IN ACUTE HEPATITIS: FRIEND OR FOE? Jonathan T. Cheah^{1,2}; Julie Kanevsky^{1,2}. ¹Montefiore Medical Center, Bronx, NY; ²Albert Einstein College of Medicine, Bronx, NY. (Tracking ID #2193973)

LEARNING OBJECTIVE #1: Describe the serologic profile of acute hepatitis B, including antibodies more commonly associated with other liver pathologies

LEARNING OBJECTIVE #2: Describe ways to differentiate between viral and autoimmune hepatitis when there is serological evidence of both

CASE: A 53-year-old man with no significant past medical history presented with a 3 month history of fatigue, nausea and weight loss of 25 lb. There was no vomiting, abdominal pain or change in bowel habits. Furthermore, there had been no recent medication changes and no reported use of over the counter supplements, illicit drugs or new sexual partners. Vital signs were stable. Examination was notable for scleral icterus, a soft, non-tender abdomen and no signs of chronic liver disease. Hemoglobin was 11.4 g/dL, white cell count 4.1 k/uL, platelet count 189 k/uL, total bilirubin 17.6 mg/dL, direct bilirubin 10.9 g/dL, alkaline phosphatase (ALP) 131 u/L, aspartate aminotransferase 1508 u/L, alanine aminotransferase (ALT) 1431 u/L and international normalized ratio 1.3. Liver tests when last checked 6 months earlier were all within the reference range. Cross-sectional imaging revealed a liver normal in size and signal intensity with no biliary tree dilatation. As the patient was hospitalized, a serological work up for the causes of an acute hepatitis was sent concurrently. This initially revealed a positive smooth muscle antibody (SMA) so a diagnosis of auto-immune hepatitis was entertained. However, this was then followed by positive hepatitis B surface antigen (HBsAg), IgM hepatitis B core antibody (IgM anti-HBc), hepatitis B e antigen (HBeAg) and a hepatitis B viral load of 1031,664 iu/mL. Additionally, anti-nuclear antibody (ANA) titer was <1:40 and anti-liver kidney microsomal (LKM) antibody was negative. The only potential cause of transmission identified was a clean shave at a barber shop and overall, the presentation felt consistent with acute hepatitis B infection.

DISCUSSION: The internist in both the outpatient and inpatient settings will encounter the discovery of markedly raised liver tests. While the differential can initially be broad, acute hepatitis occurs over 2–24 weeks when values of ALT rise to at least 800 u/L and there is an accompanying ALP rise to less than three times the upper limit of normal. This has a much narrower differential including viral, ischemic, auto-immune and toxin-mediated (for example, medications including acetaminophen) causes. Viral causes of an acute hepatitis are comprised of the hepatotropic viruses: hepatitis A, B, C, D, E as well as reactivation of hepatitis B. In the United States, acute hepatitis A, B and C are most common with hepatitis B comprising 2890 reported and 18,800 estimated cases in 2011. In adults, 70 % of acute hepatitis B infection results in a subclinical or anicteric hepatitis, 30 % have icteric hepatitis while less than 1 % progress to fulminant hepatitis. The diagnosis of hepatitis B depends on a number of serologic markers. Acute hepatitis B is defined by positive HBsAg, HBeAg (detectable at start of infection) and IgM anti-HBc (detectable 1–2 weeks after the appearance of HBsAg and at the time of rise in aminotransferase concentrations). However, other serologic markers can additionally be detected. These include auto-antibodies more commonly associated with auto-immune disease such as ANA and SMA. Classically, SMA are found in conjunction with the diagnosis of auto-immune hepatitis, which may lead to uncertainty in the diagnosis of an acute hepatitis in the early course of disease. In a range of studies, SMA was present in between 27 and 71 % of patients with acute hepatitis B infection. Furthermore, some studies have suggested that the presence of SMA, especially of the IgG sub-group, in acute hepatitis B infection may be a marker of increased likelihood of progression to chronic hepatitis B infection. However, the reason for the development of SMA in hepatitis B infection has not been well defined. If serological features of both viral and auto-immune hepatitis are present, a number of suggested differences between the two can be used to distinguish the two entities. Phenotypically, those with auto-immune hepatitis tend to be female and generally present with chronic hepatitis, while serologically, those with auto-immune hepatitis have titers of auto-antibodies (ANA, SMA or LKM) at least >1:40 and a selective elevation of IgG with levels of IgA and IgM within the reference range. Furthermore, both have distinctive appearances on liver biopsy. Additionally, there are a subset of patients who have both auto-immune and viral hepatitis concurrently, however, it is more likely to be in the setting of chronic disease and with hepatitis C infection. In conclusion, acute hepatitis B should be considered in the differential of markedly elevated ALT and can induce the development of circulating auto-antibodies which may lead to confusion regarding initial diagnosis.

AOSD MASQUERADING AS SEPSIS: A CASE REPORT Djamshed Samiev; Daniel Goldsmith; Michael S. Beede; Olga Tarasova. Capital Health Regional Medical Center, Trenton, NJ. (Tracking ID #2197535)

LEARNING OBJECTIVE #1: Recognize AOSD when it presents with symptoms characteristic of sepsis

CASE: AOSD is an inflammatory disorder of unknown etiology that is characterized by daily fevers, an evanescent rash, and arthritis. In rare cases, a patient with AOSD may present with symptoms characteristic of sepsis. Because the treatments for AOSD and sepsis are different, it is very important to correctly distinguish between the two, as early recognition of AOSD masquerading as sepsis will allow for earlier implementation of steroid treatment and better treatment outcomes. A 32 year old African American female with a known history of AOSD and rheumatoid arthritis who was being treated with

azathioprine and naproxen presented to the ER with a complaint of daily fevers, sore throat, arthralgia, and skin rash for five days. On examination, her initial vital signs were 103.20, heart rate 145, blood pressure 121/76, respiratory rate 22, saturation 97 % on room air. She had pharyngeal erythema and a salmon-pink rash on her upper extremities. Electrolytes were normal, lactic acid 1.3, WBC 8.1, bands 56, ESR 84, CRP 16.8, CXR clear, UA 6–10 WBCs. The patient was given Tylenol and aggressively hydrated in the ER. After the first liter, her heart rate went down to 125, but her systolic blood pressure dropped to the 70s. Sepsis was suspected and aggressive hydration was continued. The patient was also started on vancomycin and maxipime. The patient was transferred to the ICU, at which point her ferritin level was reported to be 4558. At this juncture, the possibility was entertained that the patient's sepsis-like presentation could be triggered by hyperferritinemic syndrome, especially considering her established history of AOSD, and the patient was started on IV steroids, which resulted in rapid improvement in her condition. On the second day, antibiotics were discontinued, and by the fourth day she was released in stable condition.

DISCUSSION: This case illustrates the potential for AOSD to present with symptoms characteristic of sepsis due to hyperferritinemic syndrome. Especially in patients with an established history of AOSD, clinicians should be aware of this possibility in order to enable earlier introduction of corticosteroids into the treatment regimen, thus achieving speedier recovery and decreased length of stay in acute care settings.

APICAL HYPERTROPHIC CARDIOMYOPATHY: A “GIANT-NEGATIVE” DIAGNOSIS Patrick J. Nolan¹; Courtney M. Moore¹; Sajith Matthews^{1, 2}; ¹WSUSOM, Northville, MI; ²Detroit Medical Center, Detroit, MI. (Tracking ID #2191707)

LEARNING OBJECTIVE #1: Recognize the distinctive ECG and TTE findings in Apical Hypertrophic Cardiomyopathy, especially in patients presenting with dyspnea, palpitations, and displaced PMI.

CASE: A 61-year old African American gentleman with past medical history of intermittent atrial fibrillation, hypertension, and COPD presented to the emergency department (ED) in an extremely somnolent state with chief complaints of shortness of breath and a “pounding heart”. On physical exam he was malnourished, dehydrated, and tachycardic at 100 beats per minute with a 5/6 holosystolic murmur heard best at the left sternal border. PMI was visible and displaced infero-laterally. There was decreased air movement globally and a prolonged expiratory phase. Arterial Blood Gas drawn in the ED showed pH=7.39, CO₂=76, HCO₃=36 and O₂=86 with no wheezing, likely reflecting compensated COPD; not an acute exacerbation. Chest radiograph showed emphysematous changes without pulmonary infiltrates. His clinical condition limited the history of present illness, leading to an EMR review exposing several ED visits. On admission 8-months prior, an ECG was performed showing apical left ventricular hypertrophy evidenced by R-waves ranging 2.0 to 3.0 mV and deeply inverted (“Giant-Negative”) T-waves (>1.0 mV) in leads V4–6. However, it was not until a later, separate, admission that a Transthoracic Echocardiogram (TTE) was ordered in response to an indeterminate troponin. TTE revealed a morphologic appearance consistent with apical variant hypertrophic cardiomyopathy including disproportionate apical segment hypertrophy, visually estimated ejection fraction >80 % with impaired relaxation pattern, and near cavity obliteration at the apex in systole. The abnormal ECG and TTE findings were combined with our patient's presentation and physical exam to, at last, establish a diagnosis of Apical-HCM. Normal saline at 100 ml/hr. and 2 L/hr. of oxygen via nasal cannula were started. Our patient became increasingly more alert and less dyspneic. He was counseled on the importance of adequate hydration, as his cardiovascular morphology is fluid dependent, and adherence to Metoprolol for increased ventricular filling time.

DISCUSSION: Apical Hypertrophic Cardiomyopathy (A-HCM), a variant in which the hypertrophied myocardium is located in the most distal portion of the Left Ventricle (LV), was first described in Japan in 1976. Prevalence of this variant represents only 1–3 % in the non-Japanese population. Symptoms may include dyspnea and palpitations, reflecting the reported arrhythmias associated with this condition. Since our patient had not received an appropriate and conclusive diagnosis of A-HCM, it is likely his COPD (resulting in recurrent ED visits with only slight improvement) and its rare occurrence in the non-Japanese population actually masked the true underlying cause as A-HCM. Therefore, abnormal cardiovascular findings on physical exam, as evident in our patient, should strongly alter the workup to pursue an alternative diagnosis. Thus, recognition of the distinctive ECG and TTE findings are vital in diagnosing A-HCM; especially in patients presenting with dyspnea, palpitations, and displaced PMI.

ARE OUR PATIENTS SAFE DURING IN-HOSPITAL TRANSPORT ??? Chandramohan Meenakshisundaram¹; Nanditha N. Malakkla¹; Dima Dandachi¹; Venu Pararath Gopalakrishnan¹; Venu M. Ganipiseti². ¹Saint Francis Hospital, Evanston, IL; ²presence saint francis, Evanston, IL. (Tracking ID #2199633)

LEARNING OBJECTIVE #1: Importance of administering incremental doses of sedatives in high risk individuals who are prone to develop respiratory depression.

LEARNING OBJECTIVE #2: To emphasize the importance of essential monitoring during in-hospital transport of patients. Discuss the basic strategies to decrease the adverse events and ensure safe transport.

CASE: Fifty-two year old obese AA female was brought by her sister to ED as she sounded confused and her speech was slurring over phone. Her past medical history included hypertension, DM, HLD, Sleep apnea and hypothyroidism. Her medications were metformin, amlodipine, Lisinopril, metoprolol, synthroid and fluoxetine. Vitals revealed tachycardia and SpO₂ of 91 %. On physical examination she appeared confused, agitated, had slurring speech but no significant neurological deficit. Basic labs were significant for leukocytosis, blood glucose of 685 mg/dl, ABG showed severe respiratory and metabolic acidosis, negative serum and urine acetone. She received ativan for agitation and placed on BiPAP support. She was given fluid boluses and started on insulin infusion. During CT imaging of brain as she remained agitated she received additional doses of ativan. Then she was transferred to ICU with only cardiac monitor. On arrival to ICU, she was found to have shallow respirations and saturated 60 % with BiPAP. She had massive emesis twice during intubation and was started on mechanical ventilatory support. Next day her CXR showed increasing infiltrates in both lung fields and her oxygen requirements were also increasing. ARDS protocol was initiated. Over the next few days she also developed AKI and eventually became oliguric. She also needed Hemodialysis for few weeks. Her TSH was elevated (30 mIU/ml) and started on IV levothyroxine. She was successfully extubated and her renal function returned to baseline in about a week. As she was deconditioned by the complicated hospital stay of 48 days she was discharged to sub-acute rehabilitation facility.

DISCUSSION: Our patient had a prolonged and complicated hospital stay that was not related to her presenting complaints but due to insufficient monitoring during imaging that was least necessary and during transport to intensive care unit after multiple doses of benzodiazepine which is well known to cause respiratory depression. The intra-hospital transport of patients is often performed by unlicensed hospital personnel who encounter patient condition changes that require immediate intervention. Risk reduction strategies include development of an intra-hospital transport team, handoff communication using a specific tool including written information facilitating clear communication before, during and immediately following transport from the patient care unit to the destination point and back. Also the transport personnel should have robust educational and competency program including CPR certification to ensure safe patient transport. All hospitals should develop a transport team model with clear outline of specific responsibilities for each team member. Every patient should be assessed for the basic level of monitoring needed, the required equipment and the expected level of intervention if there is any change in patient condition. Intra-hospital transport exposes patients to potential periods of instability and increases the risk for complications, morbidity and mortality. Physicians must evaluate the risk benefit ratio of each transport, the need of urgency of diagnostic imaging or the therapeutic procedures, and accurate information exchange will decrease the number of adverse events.

ASCITES IN A CASE OF MONOCLONAL GAMMOPATHY OF UNDETERMINED SIGNIFICANCE (MGUS). Venu Pararath Gopalakrishnan³, Sreelakshmi Panginikkod², Malav P. Parikh⁴, Chandramohan Meenakshisundaram³, Mashooque Dahar², Ubaid Sherwani¹. ¹Presence Saint Francis Hospital, Evanston, IL; ²Presence saint Francis hospital, Evanston, IL; ³Saint Francis Hospital, Evanston, IL; ⁴Saint Francis Hospital, Evanston, IL; ⁵Calicut Medical College, Calicut, India. (Tracking ID #2199428)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of POEMS syndrome. (Polyradiculoneuropathy, Organomegaly, Endocrinopathy, Monoclonal plasma cell neoplasm, Skin changes).

LEARNING OBJECTIVE #2: Recognize the role of SAAG (Serum Ascites-Albumin Gradient) in the differential diagnosis of ascites.

CASE: A 52 year old male presented with complaints of abdominal distention associated with discomfort, fatigue and decreased appetite for past 2 months. His past medical history was significant for a diagnosis of hypothyroidism, polyneuropathy and Monoclonal Gammopathy of Undetermined Significance (MGUS). Clinical examination revealed an emaciated male with large tense ascites, pedal edema, small muscle wasting of hands and tight skin of fingers. Routine laboratory studies were unremarkable with normal Liver Function tests (LFT) including albumin. Ascitic fluid analysis revealed SAAG of 0.9 and ascitic fluid protein of 3.2. The ascitic fluid cytology was negative for malignant cells. Hepatitis serology and HIV were non reactive. CEA and CA 19-9 levels were normal. Serum protien electrophoresis was positive for an M spike. Serum immunofixation was consistent with IgA monoclonal gammopathy. The serum VEGF (Vascular Endothelial Growth Factor) and IL-6 (Interleukin—6) levels were also found to be elevated. Chest X Ray showed mild right pleural effusion. Transthoracic echocardiography showed normal ejection fraction. Computerized Tomography scan of the abdomen revealed massive ascites, normal liver, mildly enlarged spleen and retroperitoneal lymphadenopathy. Bone scan did not show any sclerotic lesions. Based on the overall clinical picture of

polyneuropathy, monoclonal gammopathy associated with splenomegaly, lymphadenopathy, hypothyroidism, sclerodermoid skin changes, features of extravascular volume overload and supporting lab results, the patient was diagnosed with POEMS syndrome and started on Melphalan and Decadron therapy. He showed significant improvement in the follow up.

DISCUSSION: POEMS syndrome is a rare paraneoplastic syndrome which is caused by an underlying plasma cell disorder. The acronym PEOMS stands for Polyradiculoneuropathy, Organomegaly, Endocrinopathy, Monoclonal plasma cell neoplasm and the Skin changes. The diagnosis of POEMS syndrome requires the presence of at least one of the three major criteria, one minor criteria and both the polyradiculoneuropathy and the monoclonal plasma cell disorder. Major criteria include Castleman disease, sclerotic bone lesions and elevated VEGF. Minor criteria include organomegaly, endocrinopathy, characteristic skin changes, papilledema, extravascular volume overload and thrombocytosis. Extravascular fluid overload most commonly manifests as peripheral edema, effusions and ascites. Only those patients with peripheral neuropathy and a plasma cell clone should be classified as having classic POEMS syndrome. Diagnosis is often delayed because the syndrome is rare and can be mistaken for other neurologic disorders, most commonly chronic inflammatory demyelinating polyradiculoneuropathy. Early recognition is important to reduce morbidity. Systemic chemotherapy with the use of melphalan plus dexamethasone has demonstrated good response rates with an acceptable toxicity profile. Median survival in patients of POEMS syndrome with extravascular fluid overload was determined to be 6.6 years as compared to overall median survival of 13.7 years.

ASYMMETRIC PLEURAL EFFUSION AS AN INITIAL PRESENTATION OF RHEUMATOID ARTHRITIS Neal George; Samer Makhoul. Conemaugh Memorial Medical Center, Johnstown, PA. (Tracking ID #2198762)

LEARNING OBJECTIVE #1: Diagnose pleural effusions associated with rheumatoid arthritis.

LEARNING OBJECTIVE #2: Diagnose atypical presentations of rheumatoid arthritis.

CASE: A 56-year-old caucasian male with no significant past medical history except for 3 month history of mild diffuse arthralgias presented to the emergency room with shortness of breath for the last 7 days. On physical exam, there was decreased air movement on the left side. Upon interview of the patient he admitted to intermittent arthralgic pain in both bilateral hands and bilateral feet that he controlled with over the counter non-steroidal anti-inflammatory medications. Laboratory studies revealed a leukocytosis of 21.1 thousand/cumm. Chest x-ray showed moderate-sized left pleural effusion and associated airspace opacity. Blood cultures remained negative after 5 days. Pulmonary medicine was consulted for thoracentesis of what was initially thought to be a parapneumonic effusion. Thoracentesis was successfully performed with 1000 mL of yellowish cloudy fluid removed from the left chest. Pleural fluid was negative for any acid-fast organisms, exhibited no growth on culture, and cytology revealed abundant mixed inflammatory cells and macrophages, and was negative for malignant cells. The pleural fluid contained RBCs of 100/cumm, WBCs of 15,000/cumm, 83 % segs, 4 % lymph's, 11 % macrophages, 2 % eosinophils, protein of 5.7gm/dL, LD 5005 IU/L, glucose was <5 mg/dL, and pH was 7.10. Lyme serology was negative. Rheumatoid factor was positive with a titer of 320 IU/mL and an elevated erythrocyte sedimentation rate of 32 mm/hr. Pt was treated with methylprednisolone intravenously and subsequently discharged on oral prednisone with significant improvement of his arthralgias and shortness of breath. Pt is currently undergoing rheumatologic evaluation and treatment for his rheumatoid arthritis.

DISCUSSION: Rheumatoid arthritis (RA) is a systemic inflammatory destructive process that characteristically attacks joints. RA can contribute to increased mortality through its extra-articular pulmonary, cardiac, and vascular manifestations. Pulmonary manifestations contribute to 10 to 20 % of all mortality amongst patients with RA and tend to occur within 5 years after initial diagnosis. Pleural effusions tend to occur in approximately 5 % of patients and tend to be small and asymmetric, and occur more frequently in males than females. Patients who develop RA associated pleural effusions tend to have high titers of rheumatoid factor that may precede joint involvement. Avnon LS et al. 2007 conducted a literature review and found that 95 % of patients with RA-associated pleural effusions had high titers of rheumatoid factor. RA associated effusions account for only 0.6 % of all exudative pleural effusions. Pleural fluid associated with this type of effusion typically shows a low glucose level (<50 mg/dL), high lactate dehydrogenase (>1000 IU/L), and low pH (<7.30). No consensus exists of how RA associated effusions appear upon cytological evaluation. Further studies are needed to elucidate if cytology plays a role in distinguishing these exudative effusions from other causes for exudative effusions. Treatment with systemic steroids and intra-pleural steroids are effective in most cases. The above case illustrates that the initial presentation for RA can manifest atypically as an exudative pleural effusion and is therefore often overlooked by clinicians.

AXITINIB INDUCED CARDIOMYOPATHY Christopher A. D'Avella; Rahul Parikh. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2195102)

LEARNING OBJECTIVE #1: Recognize the existence of cardiovascular complications associated with Vascular Endothelial Growth Factor (VEGF) tyrosine kinase inhibitors (TKI) including axitinib

LEARNING OBJECTIVE #2: Emphasize the importance of monitoring subjects on Vascular Endothelial Growth Factor (VEGF) tyrosine kinase inhibitors (TKI) for cardiomyopathy

CASE: Sixty year old male with history of hypertrophic cardiomyopathy, coronary artery bypass surgery and septal myectomy 6 years prior to presentation was started on axitinib for metastatic renal cell carcinoma. His co-morbidities included obstructive sleep apnea, chronic renal insufficiency and hypertension. He started axitinib in June 2013 after progression on sunitinib (VEGF tyrosine kinase inhibitor) and everolimus (mammalian target of Rapamycin (mTOR) inhibitor). A baseline echocardiogram prior to starting axitinib showed an ejection fraction of 40–45 % with no wall-motion abnormalities. Six weeks after initiation of axitinib, the patient developed increased fatigue and dyspnea on exertion. His examination revealed bilateral lower extremity edema, normal S1 and S2, no murmurs nor elevated JVP. Repeat echocardiography demonstrated acute worsening in his ejection fraction to 25–30 % with mild dilation of the left ventricle. His EKG showed no acute changes and no acute coronary syndrome. His laboratory findings including a CBC and BMP were within normal limits. Though not previously reported, his clinical course suggested possible axitinib induced cardiomyopathy; axitinib was held and enalapril, carvedilol, and furosemide were initiated. The patient's symptoms improved off axitinib and a repeat echocardiogram 6 weeks later showed an improvement in his ejection fraction to 35–40 %. Subsequently, a case report of axitinib-induced Takotsubo like syndrome was published.¹

DISCUSSION: Myocardial toxicity is a known side effect of many cancer treatments. The anthracyclines doxorubicin, daunorubicin, epirubicin and mitoxantrone have known cardiotoxicity; additionally, myocardial injury has also been associated with tyrosine kinase inhibitors, alkylating agents, anti-metabolites, proteasome inhibitors and anti-microtubule agents.² Recently, a number of VEGF-R directed targeted therapies have been approved for the treatment of metastatic renal cancer. In this case, a patient with metastatic renal cell carcinoma and pre-existing cardiac disease developed a reversible cardiomyopathy while taking axitinib. Axitinib targets the vascular endothelial growth receptors 1, 2 and 3 and is approved as a second line therapy for metastatic renal cell carcinoma based on results of a Phase III AXIS study.³ Four additional VEGF inhibitors-sunitinib, pazopanib, sorafenib and bevacizumab- are also approved for the treatment of metastatic renal cell carcinoma. Traditionally, fatigue and hypertension have been the most commonly reported side effects with this class of targeted therapies. Cardiomyopathy has been associated with the use of sunitinib, bevacizumab, and sorafenib. An association between pazopanib or axitinib and cardiotoxicity has not been well described.⁴ Phase III clinical trials for axitinib showed a small incidence of cardiomyopathy.³ Compared to anthracyclines, cardiotoxicity associated with tyrosine kinase inhibitors appears to be less profound but more acute in presentation and is not dose-dependent. Treatment of VEGF inhibitor associated cardiomyopathy includes cessation of therapy with close follow up to monitor for recovery of systolic function. The reversibility of this cardiomyopathy is unknown, although limited literature with sunitinib induced cardiotoxicity suggests improvement in ejection LV function and symptoms after cessation of the drug.⁵ In our subject, cardiac function improved dramatically after discontinuing axitinib. Targeted therapies have an ever-expanding role in modern medicine, and likewise, VEGF inhibitors are commonly utilized for treatment of metastatic kidney cancer. Adverse effects of these new agents are continuing to be evaluated; further studies are needed to delineate their cardiovascular side effects. Generalists and subspecialists alike should be aware of possible cardiotoxicity in association with targeted therapies, especially in patients with cardiac comorbidities, and should monitor patients accordingly. 1. Ovadia D, et al. Association Between Takotsubo Cardiomyopathy and Axitinib: Case Report and Review of the Literature. *Journal of Clinical Oncology*. 2014; 32:1–3 2. Floyd JD, et al. Cardiotoxicity of Cancer Therapy. *J Clin Oncol*. 2005; 23(30):7685–96 3. Rini BL, et al. Comparative Effectiveness of Axitinib versus Sorafenib in Advanced Renal Cell Carcinoma: A Randomised Phase Three Trial. *Lancet*. 2011; 378(9807):1931–39 4. Rees M, et al. Molecular Mechanisms of Hypertension and Heart Failure Due to Antiangiogenic Cancer Therapies. *Heart Fail Clin*. 2011; 7(3):299–311 5. Chu TF, et al. Cardiotoxicity Associated with Tyrosine Kinase Inhibitor Sunitinib. *Lancet*. 2007; 370(9604):2011–19

BACK PAIN MADE WORSE Madeline E. Petty²; Claire A. Evans²; Thomas Montgomery¹. ¹Carolinas Healthcare System, Charlotte, NC; ²Carolinas Medical Center, Charlotte, NC. (Tracking ID #2200140)

LEARNING OBJECTIVE #1: Recognize that the clinical signs of spinal epidural abscess (SEA) are localized back pain, fever and neurological changes, and that intramuscular injections for analgesia are a predisposing risk factor.

LEARNING OBJECTIVE #2: Treat SEAs with prolonged antibiotic therapy for at least 8 weeks and surgical drainage when appropriate to avoid complications.

CASE: The patient is a 60 year old woman with a past medical history of mild low back pain who developed severe right-sided lumbar back pain after twisting her back while playing with her grandchildren. She received an intramuscular injection containing 10 mg of dexamethasone, 60 mg of orphenadrine, and 60 mg of ketorolac to her right gluteus muscle for possible sciatica 12 days before presentation. Six days later she continued to have pain, so she saw her primary care physician who performed a magnetic resonance imaging scan (MRI). This showed mild degenerative changes with a minimal annular bulge at L5-S1. Six days later, she presented to the hospital for weakness, severe back pain, hypotension, tachycardia, fever, and leukocytosis to 35,000/microL. Her lumbar paraspinal muscles on the right side were exquisitely tender to palpation. The pain radiated down her right leg and she was unwilling to move that leg. She was neurologically intact but she was having some episodes of urinary incontinence. She underwent a repeat MRI of her lumbar spine which revealed an L3-S1 epidural abscess, several paraspinal abscesses and right sacroiliitis (images included). The infection was thought to have originated in the right sacroiliac (SI) joint. A computed tomography-guided aspiration was performed, but all cultures were negative for growth. A transesophageal echocardiogram was performed which showed no evidence of valvular vegetations or endocarditis. Two sets of blood cultures were performed which revealed no growth. She was treated with 8 weeks of intravenous (IV) vancomycin and cefepime. Her infection, as well as her pain, completely resolved.

DISCUSSION: A spinal epidural abscess (SEA) is a collection of pus between the dura mater and the ligamentum flavum. The development of these abscesses is relatively rare. However, if they are not diagnosed and treated, they can lead to septic shock, spinal cord impingement and irreversible paralysis. The clinical signs of SEA are localized back pain, fever and neurological changes. The incidence of SEAs has increased recently, possibly due to an increase in the number of spinal procedures and IV drug use. The organism responsible for SEAs in 50–90 % of cases is *Staphylococcus aureus*. The incidence of Methicillin-resistant *S. aureus* (MRSA) is increasing, especially in IV drug users and those with a history of spinal surgery. Other organisms that can cause SEA include *Streptococci*, gram negative bacilli, *Nocardia* species, *Mycobacterium tuberculosis* and fungi. In this case, the patient's paraspinal and epidural abscesses were thought to be secondary to right-sided pyogenic sacroiliitis. The sacroiliitis itself was secondary to a right gluteal injection that she received. Epidural abscesses are usually caused by hematogenous dissemination. However, her blood cultures were negative and no evidence of endocarditis was found. In her case, the infection was undoubtedly spread by direct dissemination from adjacent structures. Our patient did not have any of the other usual risk factors for SEA, such as diabetes mellitus, blunt spinal trauma, or a history of back surgery, alcohol abuse, or IV drug use. No organisms were identified on culture of aspirated pus from her largest paraspinal abscess. Therefore she was treated with broad-spectrum first-line coverage for MRSA and aerobic gram negative bacilli. She did not require surgical drainage as she improved with antibiotics alone. Our case demonstrates that intramuscular injections for analgesia should be considered a predisposing risk factor for spinal epidural abscess. If these patients present with localized pain and fever, they should receive a prompt MRI with contrast enhancement. Prolonged antibiotic use for at least 8 weeks and surgical drainage depending on the situation are the appropriate treatment choices to avoid spinal cord compression and sepsis.

BACTERIAL MENINGITIS WITHOUT CEREBROSPINAL FLUID PLEOCYTOSIS Dipti Baral¹; Bhishma Pokhrel²; Bhaskara Madhira¹. ¹SUNY Upstate Medical University, Syracuse, NY; ²National Academy of Medical Sciences, Kathmandu, Nepal. (Tracking ID #2196644)

LEARNING OBJECTIVE #1: Manage suspected bacterial meningitis in the absence of cerebrospinal fluid changes

CASE: A 46-year-old African American woman with history of migraine, systemic lupus erythematosus (SLE) and lupus cerebritis in the past came in with 3 days history of headache, lethargy, photophobia and 1 day history of fever and nausea. Two weeks ago, she had increased pain in her back and left shoulder and had started taking prednisone 10 mg regularly, which she was taking inconsistently in the last 2 years. On examination, she was alert, oriented but febrile with a temperature of 102 F. She had neck tenderness; Kernig's and Brudzinski's signs were negative. Labs showed $14 \times 10^9/L$ white cell counts (WBC) with 81 % neutrophils. Lumbar puncture (LP) in lateral recumbent position revealed an opening pressure of 39 cc of water. Cerebro-spinal fluid (CSF) analysis showed 6 WBCs/microliter (μL) with 54 % polymorphs, glucose of 4.2 mmol/L, and protein of 0.29 g/L with no organisms in gram stain. Chest X-ray and urine analysis didn't suggest infection. She was human immunodeficiency virus negative. She was started on empiric antibiotics for possible meningitis. Rheumatologic work up including antinuclear antibody, lupus anticoagulant, C3- C4 complement level was negative; erythrocyte sedimentation rate and C-reactive protein were elevated at 89 mm/hr and 146 mg/L respectively.

MRI brain showed chronic progressive small vessel ischemic changes. She was determined not to be in lupus cerebritis. Both blood culture and CSF culture sent at admission came out positive for *Streptococcus pneumoniae*. Transesophageal echocardiogram showed less than 1 cm vegetation in the aortic valve and moderate aortic insufficiency. She is waiting for aortic valve replacement after the completion of 6 weeks of ceftriaxone.

DISCUSSION: Bacterial meningitis is a life-threatening neurological infection and requires immediate intervention. LP and CSF analysis are the initial diagnostic work-up that help to confirm the diagnosis and guide treatment. Upto 5 red blood cells and/or 5 WBCs/ μ L of CSF are considered normal. Bacterial meningitis without CSF pleocytosis can occur in pediatric population but is rarely seen in adults. A Low CSF cell count has been described in immune-compromised people and very early stages of meningitis, without enough inflammatory process. Literature has advocated a repeat LP the following day if first LP is negative. A falsely low CSF white count is possible due to the settling of the cells in the CSF or due to the adherence of cells to plastic tubes if CSF is analyzed more than 60 min after lumbar puncture. If bacterial meningitis is a clinical suspicion, empirical antibiotics should be promptly instituted to avoid potential neurological complications. Normal appearing CSF counts, glucose and protein don't exclude bacterial meningitis and hence, shouldn't delay treatment; treatment should be completed unless meningitis is confidently ruled out.

BENIGN T WAVE INVERSION WITH ACUTE BELLY DILLI R. POUDEL¹; Paras Karmacharya¹; Ranjan Pathak¹; Sushil Ghimire¹; Raju Khanal¹; Ana Salvatierra¹; Madan R. Aryal². ¹Reading Health System, West Reading, PA; ²The Reading Hospital and Medical Center, Wyomissing, PA. (Tracking ID #2198992)

LEARNING OBJECTIVE #1: Consider acute abdomen (eg. cholecystitis, colitis) as a cause of T wave inversion in EKG in a person without cardiac comorbidity.

CASE: A 76-year-old non-smoker without significant cardiac history presented with sudden onset lower abdominal pain, diaphoresis, nausea and multiple episodes of bloody diarrhea of one day. He denied any history of sick contacts, fever, chills or vomiting. Physical exam was positive for left lower quadrant tenderness without guarding or rigidity. Laboratory evaluation revealed leukocytosis without left shift. Computed tomography showed inflammation of the left descending colon. Patient was diagnosed with ischemic colitis and was managed conservatively with gradual improvement in symptoms. Interestingly, patient was also noted to have new T wave inversion in the infer-lateral leads at the time of admission. Patient denied any cardiac complaints and serial troponins were negative. Echocardiographic evaluation showed normal ejection fraction without any regional wall motion abnormalities. Repeat EKG on day 5, after the resolution on colitis, showed improvement in T wave inversion.

DISCUSSION: T wave changes are generally cardiac in origin but can be associated with benign non-cardiac causes. Acute abdominal pathology such as acute cholecystitis, acute pancreatitis are well recognized cause of T wave inversions but our case suggests that even acute colitis can also lead to such EKG changes. Knowledge of this association might help clinicians avoid unnecessary invasive interventions in patients with acute colitis and low cardiovascular risk factors.

BETWEEN A ROCK AND A HARD PLACE: A PATIENT WITH HEPARIN-INDUCED THROMBOCYTOPENIA AND CONCURRENT BLEEDING Shreevinaya Menon; Jessica Zuleta. University of Miami, Miami, FL. (Tracking ID #2198032)

LEARNING OBJECTIVE #1: Manage heparin-induced thrombocytopenia in the setting of clinically significant bleeding

LEARNING OBJECTIVE #2: Review presentation, diagnosis and treatment of type II heparin-induced thrombocytopenia

CASE: An 82-year old male with symptomatic, severe aortic stenosis (aortic valve area 0.7 cm²) was electively admitted for hemodynamic assessment of his valve by cardiac catheterization via right radial artery and right brachial vein. His medical history was also notable for obstructive sleep apnea, heart failure, hypertension and diabetes. The patient's recovery was complicated by post-procedure atrial fibrillation requiring therapeutic anticoagulation with unfractionated heparin (UFH) drip protocol. Subsequently, the patient underwent balloon aortic valvuloplasty with hemodynamic assessment via right femoral artery and vein approach as a bridge therapy for eventual Transcatheter Aortic Valve Replacement (TAVR). The second catheterization was complicated by post-procedure hypercapnic respiratory failure requiring intubation. Once the patient was hemodynamically stabilized and successfully extubated, he was transferred to a medical telemetry bed. Due to a CHADS₂ score of four, bridging anticoagulation to an oral vitamin K antagonist (VKA) was initiated. During his protracted hospital stay after the cardiac interventions, the patient complained of right groin pain with a visible hematoma. Hematologic evaluation revealed a platelet count of 75,000/ μ L compared to an admission

level of 130,000/ μ L. Diagnostic imaging demonstrated a 6.5×6.2×9.2 cm right psoas muscle hematoma. In light of the recent cardiac interventions and thrombocytopenia, all anticoagulation was discontinued. Platelet count continued to drop to 42,000/ μ L in the context of a large, symptomatic psoas hematoma necessitating an urgent platelet transfusion. Subsequent testing showed an anti-platelet factor 4 (PF4) antibody level of 3.088 optical density (optical density >2 considered positive) and confirmatory serotonin release assay (SRA) showing 99 % serotonin release with low-dose UFH (>20 % serotonin release considered positive). This indicated a diagnosis of heparin-induced thrombocytopenia (HIT). In light of this treatment dilemma, Hematology was consulted to assist with the management of HIT in the context of a significant bleed. Since the patient's hemoglobin remained stable, the initial recommendation was to avoid further anticoagulants with continued surveillance of the platelet count and hematoma size. Radiographic follow-up of the hematoma showed no change in size but did demonstrate increasing high-density material suggesting interval additional bleed while the platelet count continued to decrease to 17,000/ μ L. Due to worsening thrombocytopenia and bleeding, Hematology suggested immediate intravenous immunoglobulin (IVIG) infusion. From that day forth the platelet count increased, stabilizing around 130,000/ μ L. TAVR workup was resumed and, per protocol, a computed tomography scan of the chest was performed for pre-procedural planning of aortic valve implant size and suitable access route. This scan incidentally found bilateral pulmonary emboli. Subsequent lower extremity ultrasound demonstrated bilateral deep vein thromboses. Inferior vena cava filter was placed as a temporizing measure until anticoagulation could be initiated. Once the platelet count was uptrending with IVIG treatment, the patient was started on an argatroban drip bridging to VKA. Psoas hematoma size was unchanged on repeat imaging done 2 weeks later. Platelet count remained stable at a follow-up ambulatory visit 5 months later.

DISCUSSION: HIT is a common hematologic problem encountered by internists. There are two types of HIT with Type 2 being the immune-mediated, clinically significant phenomenon requiring intervention. Heparin exposure leads to autoantibody production directed against a complex of PF4 with heparin. This manifests as thrombocytopenia with arterial and venous thromboses. Enzyme-linked immunoassay testing (anti-PF4 antibody) with an optical density >2 corresponds to a high likelihood of SRA positivity. SRA is considered the gold standard test for diagnosis. Treatment involves discontinuation of heparin and initiation of alternative, non-heparin anticoagulants to prevent and treat thromboses. Bleeding is not a known complication of HIT and there are no guidelines on how to manage HIT in the setting of a clinically significant bleed. Published guidelines on the use of IVIG do not recommend it as a therapy for HIT. However, a literature search yielded a limited number of case reports demonstrating successful treatment of HIT with IVIG. Our case highlights the unique situation of HIT with concurrent bleeding in which IVIG may be the most feasible treatment choice when guideline-recommended, non-heparin anticoagulants are contraindicated.

BIOPSY, BIOPSY, AND BIOPSY AGAIN: AN UNEXPECTED CAUSE OF SPONTANEOUS PNEUMOTHORAX IN AN HIV-INFECTED WOMAN Deep Shah; Abeer Memon; Varun Phadke; Minh Nguyen; Anandi Sheth. Emory University School of Medicine, Atlanta, GA. (Tracking ID #2193570)

LEARNING OBJECTIVE #1: Evaluate for non-infectious causes of pneumothorax in HIV patients with reconstituted immunity

LEARNING OBJECTIVE #2: Recognize the clinical and histopathologic challenges in distinguishing uterine sarcoma, specifically endometrial stromal sarcoma, from benign uterine leiomyoma and the survival benefit of early diagnosis

CASE: A 41-year-old Mexican woman with HIV/AIDS (CD4=439 cells/mm³ on antiretroviral therapy, CD4 nadir=79 cells/mm³) presented to her primary care clinic with cough, pleuritic chest pain, and shortness of breath at the time of menses. Her past medical history was notable for latent Tuberculosis. Two years earlier, she underwent removal of a uterine mass diagnosed as benign uterine leiomyoma. On examination, her temperature was 36.9 °C, pulse 101 beats per minute, and blood pressure 150/81 mmHg. She was in mild respiratory distress with respiratory rate 18 breaths per minute and oxygen saturation 99 % on supplemental oxygen at 2 l per minute. Pulmonary exam was significant for decreased breath sounds at the left lung base. Abdominal exam was unremarkable. Chest x-ray showed bilateral pneumothoraces. The patient was admitted, and chest tubes were placed. Computed tomography (CT) with intravenous contrast demonstrated bilateral pneumothoraces, scattered cavitary pulmonary nodules, hilar lymphadenopathy, and heterogeneously enlarged uterus and bilateral adnexa. Laboratory and microbiologic work-up was non-diagnostic, notable only for an elevated CA-125 (41.5 U/mL, normal 0–20 U/mL). Percutaneous biopsy of the pulmonary nodules and transbronchial biopsy of a left hilar lymph node were unrevealing. A video-assisted thoracoscopic biopsy of several left-sided pulmonary nodules established a diagnosis of metastatic (stage IV) endometrial stromal sarcoma. The patient was started on hormonal therapy and eventually underwent total abdominal hysterectomy with bilateral salpingectomy.

DISCUSSION: Spontaneous pneumothorax is an uncommon but potentially serious cause of respiratory distress, particularly in HIV patients. In significantly immunosuppressed patients ($CD4 < 200$ cells/mm³), infection is the predominant etiology. Pneumocystis jirovecii and Mycobacterium tuberculosis are the most frequently implicated pathogens. In this case, negative microbiologic evaluation and reconstituted immunity ($CD4 > 400$ cells/mm³) prompted consideration of alternate processes, such as parenchymal lung disease, catamenial pneumothorax, or malignancy. Most impressive, though, was her history of uterine mass in the setting of an enlarged uterus and bilateral adnexa as well as an elevated CA-125. These findings were suggestive of a gynecologic cancer. Excisional lung biopsy ultimately served as both a diagnostic and staging procedure, yielding a diagnosis of metastatic endometrial stromal sarcoma (ESS). Distinguishing between benign uterine leiomyoma and uterine sarcoma is difficult, particularly the subtype ESS which accounts for 15 % of all uterine sarcomas. Both benign and malignant pelvic tumors present with similar symptoms, including vaginal bleeding and pelvic discomfort. Imaging is typically inconclusive. Pathology is required to diagnose ESS, but false negatives are common due to sampling error and overlapping cytopathologic profiles between fibroids and ESS. A retrospective analysis of 15 ESS cases showed that 40 % were initially misdiagnosed as benign lesions, resulting in a mean delay in diagnosis of 143 months (Amant 2003). Early detection is key as the 5-year survival rate for metastatic ESS is 50 % (Chang 1990). Lung is the most common site of spread. General internists may glean several diagnostic and management pearls from our case of metastatic ESS presenting with spontaneous pneumothoraces in a HIV-infected patient. First, while respiratory infections are frequently associated with pneumothorax in HIV patients, evaluation in individuals with reconstituted immune systems should extend beyond infectious processes. Our patient's history of uterine mass, abnormal imaging, and elevated CA-125 were concerning for metastatic disease. Second, benign uterine leiomyoma and ESS, a subtype of uterine sarcoma, are difficult to distinguish clinically and histopathologically. Physicians may need to reconsider a patient's prior diagnosis of fibroids to identify a missed cancer. Finally, early recognition of ESS has a significant impact on overall prognosis. If suspicion of uterine sarcoma, physicians should involve a pathologist with expertise in gynecologic cancers.

BISPHOSPHONATES CAUSES OSTEOMYELITIS IN ADDITION TO OSTEONECROSIS OF JAW Ravi Thimmisetty; Syed Javeria; Renuga Vivekanandan. Creighton University Medical Center, Omaha, NE. (Tracking ID #2200203)

LEARNING OBJECTIVE #1: Recognize that definition of osteonecrosis of jaw from bisphosphonates also includes infection.

LEARNING OBJECTIVE #2: Distinguishing the bisphosphonates related Osteomyelitis & Osteonecrosis of Jaw is very difficult.

CASE: Sixty-six year old man came to clinic c/o right jaw pain and foul smelling greenish discharge from 4 weeks. Past medical history includes hypertension, edentulous, history of mandibular fistula, Multiple myeloma diagnosed in 10/2012, chronic Hepatitis C infection, autologous bone marrow transplant, pathologic fracture of vertebrae, pancytopenia, nephrolithiasis, neurogenic bladder s/p intermittent suprapubic catheterization, tooth extractions. Medications includes monthly zoledronic acid, norvasc, gabapentin, folic acid, trimethoprim/sulfamethoxazole twice weekly. Patient was on pamidronate for 18 months and then monthly zoledronic acid for 5 months so far. Social history includes one pack per day for almost 35 years, minimal alcohol use and no illicit drugs. His vitals are completely normal and on exam there is sub-mental fistula on right side of jaw with greenish foul smelling discharge and area is very tender to palpation. Rest of exam reveals normal findings. We suspected osteomyelitis of jaw and as his vitals and laboratory results are normal and also there is no SIRS criteria, planned to treat as an outpatient. Discontinued zoledronic acid and ordered wound swab and blood cultures and then started clindamycin. CT scan of mandible showed circumscribed osseous lesion involved in right mandible at the site of presumed prior dental extraction, may represent chronic osteomyelitis or osteonecrosis of right jaw, but there is no distinct abscess or fluid collection. No fistula or sinus tract identified. Patient improved symptomatically within 3 weeks and on exam the right mandible appears clean, there is no discharge and is non-tender. We continued clindamycin for another 3 weeks. Final wound swab cultures showed mixed organisms and blood cultures were negative.

DISCUSSION: This case illustrates that bisphosphonates are having potential to cause osteomyelitis. There were few case reports published after the first case of bisphosphonate-related osteonecrosis of the jaw (BRONJ). Both of them have similar pathogenesis and causes confusion about the diagnosis and treatment. The estimated incidence of bisphosphonates related osteomyelitis of jaw among patients with cancer receiving intravenous bisphosphonate therapy the incidence is between 0.5 and 4 %, depending on the dose, frequency, and duration of therapy (on average, approximately 2 %). Osteomyelitis of the jaw in long-term survivors of multiple myeloma who are receiving chronic bisphosphonate therapy may be a new clinical entity. Although it is not possible to prove beyond doubt an etiologic link between bisphosphonate therapy and the

occurrence of osteomyelitis of the jaw, the association of multiple myeloma with severe immunosuppression, the prolonged bisphosphonate therapy, and the localization to the jaw all point to a relationship. Our patient have risk factors for developing osteomyelitis of jaw which includes intravenous bisphosphonate therapy, immunosuppression, dentures, and periodontal surgeries. All bony exposures in oral cavity is not always caused by avascular necrosis of jaw from bisphosphonates. All health care providers should be aware of 4 stages in defining osteonecrosis of jaw and from stage 2 and above includes infection and raise of concept of osteomyelitis of jaw and therefore have low threshold of starting antibiotics and referral to surgery at the same time.

BLACK HOLE AND A REVELATION John O'Reilly; Naomi Karlen. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198608)

LEARNING OBJECTIVE #1: Discuss the clinical presentation and radiographic findings of pulmonary mucormycosis in the immunocompromised patient.

LEARNING OBJECTIVE #2: Review the clinical utility of bronchiolar lavage and CT-guided lung biopsy.

CASE: A 34 year-old woman presented with right axillary pain and fevers for 2 weeks. The pain was worse with movement and inspiration. She also reported having hemoptysis and increasing shortness of breath over this period. She had a history of chronic myelogenous leukemia, which had progressed into a blast crisis, and recently completed her first round of induction chemotherapy. Physical exam revealed tachycardia, a normal respiratory rate and blood pressure, and decreased breath sounds with dullness to percussion over the left upper lung field. Laboratory studies demonstrated pancytopenia with an absolute neutrophil count of 60 cells/microliter. CT imaging of the lung showed a 6.0 by 5.8 cm peripheral left upper lobe cavitary lesion with a reversed halo sign. The initial work-up, including bacterial and fungal blood cultures, AFB sputum stains, viral serologies and PCR, galactomannan, and (1→3)-beta-D-glucan assay was negative. Broad-spectrum antibiotics, acyclovir, and voriconazole were started. A bronchiolar lavage showed no evidence of bacteria, hyphae, or malignant cells. She remained febrile despite treatment and her lung lesion expanded on repeat imaging. CT-guided lung biopsy was performed. Pathology revealed broad, non-septate hyphae, branched at right angles. Silver staining confirmed mucormycosis. She was treated with amphotericin but was not a candidate for surgery given her medical comorbidities.

DISCUSSION: Internists often in the inpatient setting encounter fever in the neutropenic patient. It can present a diagnostic challenge due to a broad differential diagnosis. While fungal causes are typically considered, especially in a cavitary lung lesion, it is important to remember that not all fungi are alike. Galactomannan and (1→3)-beta-D-glucan tests are useful for diagnosing *Aspergillus*, *Candida*, *Histoplasma*, and *Coccidioides*. However, they do not detect any of the mucormycosis, *Blastomyces*, or *Cryptococcus*. In addition, mucormycosis does not grow in blood cultures or on routine culture media, so a high index of clinical suspicion is needed. Imaging may be helpful in making the diagnosis. The reversed halo sign seen on CT represents a central area of ground glass opacity surrounded by a ring of consolidation. In the non-immunocompromised host, this finding has classically been associated with cryptogenic organizing pneumonia. However, in the immunocompromised patient, it may be highly indicative of pulmonary mucormycosis. Bronchiolar lavage (BAL) may be helpful in making the diagnosis for fungal infections. However, when evaluating a peripheral lung lesion, particularly an abscess, the BAL may only reveal colonizing organisms of the respiratory tract. An indeterminate result on BAL with a strong suspicion for mucormycosis should be followed up with a CT-guided biopsy for definitive diagnosis. If mucormycosis is suspected, amphotericin should be added to the treatment regimen, as monotherapy with fluconazole or voriconazole is not effective. For stable patients without significant co-morbidities, surgical debridement of lung lesions is recommended.

BOCHDALEK HERNIA PRESENTING AS FLANK PAIN IN A PREGNANT WOMAN Naoki Takamatsu²; Christine Kwan¹. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Sapporo-shi, Japan. (Tracking ID #2193592)

LEARNING OBJECTIVE #1: Recognize that Bochdalek hernias can occur in adults and present with vague gastrointestinal (GI) symptoms

LEARNING OBJECTIVE #2: Treat Bochdalek hernias in pregnant women with emergent surgery

CASE: A G₃P₁ 29 years old Asian woman in her 29th weeks' gestation presents with 1 day's sudden-onset, worsening left flank pain that is dull, constant, 6/10, radiating to her left shoulder, not improved by anything, worsened by lying supine, and associated with nausea. Other review of systems is within normal limits (WNL). The patient's medical history includes treated Kawasaki disease, asthma on salmeterol/fluticasone, and a previous Cesarean (C-) section at 40 weeks' gestation. She does not use tobacco, alcohol, or recreational drugs. Prenatal checkups have shown no abnormalities. Family history is not

significant. On exam, vital signs include temperature 37 C, heart rate 108, blood pressure 108/81, respiratory rate 24, and O₂ saturation 97 % room air. She appears calm, alert/oriented x3, and non-obese. Lung sounds are decreased in the left base. GI exam shows a 10 cm, well-healed vertical incisional scar in the lower abdomen, normal percussion, and diffuse left flank tenderness without guarding, rebound, rigidity, or CVA tenderness; bowel sounds are decreased. Uterine fundus is normal for date. Otherwise, her exam is WNL. Labs/imaging show complete blood counts, chemistries, cardiac markers, D-dimer, urinalysis, and abdominal/transvaginal ultrasound (U/S) WNL. Chest x-ray reveals radio-opaque blunting of the left costophrenic angle, possibly from a pleural effusion. Just prior to the U/S-guided thoracentesis, the U/S reveals a solid echogenic mass, likely bowel loops, in the left thoracic cavity, which is corroborated on a chest/abdominal computed tomography. Emergent surgery is thus performed, which confirms a Bochdalek hernia. The postoperative period is uneventful, and her pregnancy is allowed to continue until 38 weeks' gestation at which time elective C-section will be performed.

DISCUSSION: Bochdalek hernia, the most common congenital diaphragmatic hernia (DH), is mostly found in the neonatal period, rarely carrying over into adulthood. Only ~150 cases of delayed presentation of DH in adults are described in literature. Symptomatic maternal DH during pregnancy is a surgical emergency and may lead to life-threatening complications, such as intestinal obstruction/strangulation, hemothorax, shock, and even sudden death; it has led to maternal deaths in 10 % and fetal deaths in 13 % of reviewed cases. While a reluctance to expose an unborn child to radiation exists, a literature review reveals an alarming number of misdiagnoses in 50 % due to misreading chest radiographs and atypical symptoms. Although appropriate treatment depends on the gestational age, once identified, the hernia should be repaired with prompt surgery. The patient's acute onset of flank pain occurs without any preceding trauma or strenuous activity, which suggests a hernia of congenital origin. The clinical presentation of hernias during pregnancy varies widely, and the vague symptoms, most commonly being vomiting, abdominal pain, and dyspnea, may mimic other thoraco-abdominal diseases. Adult Bochdalek hernias rarely occur but do represent a well-recognized clinical entity. This case underscores the importance to be aware of its existence, as misdiagnoses and management delays result in lethal complications if left untreated.

BOTH LOW VOLTAGE ON ECG IN SPITE OF HYPERTROPHY ON ECHOCARDIOGRAM MAY SUGGEST CARDIAC INFILTRATION RATHER THAN TRUE MYOCARDIAL HYPERTROPHY Takafumi Takase¹; Takehiko Takeda¹; Kazumasa Suga²; Mitsunori Iwase^{1, 2}. ¹TOYOTA memorial hospital, Aichi, Japan; ²TOYOTA memorial hospital, Toyota, Japan. (Tracking ID #2191121)

LEARNING OBJECTIVE #1: Recognize the importance of sequential comparisons of echocardiography and ECG to diagnose infiltrative cardiac disease.

LEARNING OBJECTIVE #2: Distinguish patients with unexplained heart failure and various symptoms.

CASE: The patient is a 67 year-old female. She was well until she was diagnosed hypertension 4 months ago. Over the last 2 months prior to admission, exertional dyspnea and leg edema have gradually developed. Besides of these symptoms, she had various symptoms including skin rash, headache, nausea, constipation and abdominal pain. On examination, she appeared to be in mild respiratory distress. Her vital signs were as following, blood pressure: 142/54 mmHg, pulse: 69 beats per minute, respiratory rate: 18 per minute and oxygen saturation: 96 % on room air. Holosystolic murmur at the left sternal border was auscultated. Pitting edema was noted in bilateral lower legs. The BNP level was 982.2 pg/mL, the troponin level 0.18 ng/mL, creatine kinase (CK) 1875 U/L, CK-MB 11.1 ng/mL, and creatinine 0.61 mg/dL. Chest radiography showed cardiomegaly and bilateral pleural effusions. ECG showed low voltage and flat T wave. Echocardiography showed and left ventricular ejection fraction (EF) 77.2 %, E/E' 23.62, estimated RV pressure up to 60 mmHg, moderate tricuspid regurgitation, and mild LVH (IVST 11.6 mm). These findings indicated diastolic LV dysfunction with mild LVH. There was no sign of granular sparkling appearance. Contrast-enhanced computed tomography (CT) did not reveal acute pulmonary embolism or deep-vein thrombosis. Right and left heart catheterization revealed pulmonary capillary wedge pressure (PCWP) was 10 mmHg and cardiac index was 3.43 l/min/m². Coronary angiography revealed minimal luminal irregularities with no evidence of plaque rupture or thrombus. Because the burden of disease appears more likely in the heart rather than in the lung, RV endomyocardial biopsy was performed. The final diagnosis was cardiac amyloidosis secondary to be primary AL amyloidosis because of the serum kappa free light-chain level as well as the findings of bone marrow biopsy. On the second day after the biopsy, monitoring ECG showed intermittent ventricular tachycardia and torsades de pointes. Then, an implantable cardioverter-defibrillator was placed on the 8th day. Importantly subsequent echocardiography revealed the rapid development of LVH (IVST 14 mm). Although the therapy with the regimen of dexamethasone and melphalan was initiated, her condition gradually worsened. One month after the admission, she died from multiple organ failure.

DISCUSSION: Cardiac amyloidosis should be considered in any patient with an unexplained heart failure. The typical echocardiographic findings include increased LV wall thickness without dilation of left ventricular cavity. Importantly, the echocardiographic findings of LVH in patients with amyloidosis essentially are due to abnormal infiltration of amyloid rather than cardiomyocyte hypertrophy itself. Accordingly, the typical features of ECG in this disease include not "high voltage" but "low voltage". Importantly, cardiac infiltration diseases including Fabry disease, Gaucher disease, and sarcoidosis etc. These diseases should be taken into account in patients with unexplained heart failure. The key element in the diagnosis of cardiac amyloidosis includes increased wall thickness in echocardiogram and low voltage on an ECG. When cardiac amyloidosis is suspected, a biopsy of selected cardiac or noncardiac tissue should be performed because that is the only way to define the diagnosis of amyloidosis. This case had a sign of heart failure but the its cause could not be explained at first. We performed contrast-enhanced CT and right and left heart catheterization to rule out myocardial infarction and pulmonary embolism. For further investigation, additional immunology blood test and myocardial biopsy were performed, which led to the diagnosis of cardiac amyloidosis. After that, bone marrow biopsy was performed and did confirm the diagnosis of AL amyloidosis. Most importantly, subsequent echocardiography revealed the progressive progression of LVH, which seems to reflect the rapid development of LVH. Once congestive heart failure occurs, the median survival term is 6 months in untreated patients. But the deterioration in this case developed much faster than that of typical cases. The management of cardiac amyloidosis is difficult. However, with the recent advancement in chemotherapy and autologous stem cell transplantation, the median survival term has been extended substantially. For these reasons, the diagnosis should be made as soon as possible in order to start the proper treatment before worsening of the patient's quality of daily life.

BRINGING CNS LYME INTO FOCUS: A CASE OF DECREASED VISION Hyejo Jun; Cristina Merkhofer. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2188784)

LEARNING OBJECTIVE #1: To describe the differential diagnoses for decreased vision and papillitis

LEARNING OBJECTIVE #2: To review diagnostic criteria for peripheral and CNS Lyme and options for therapy

CASE: A 60 year-old Caucasian male with hypertension and right eye blindness secondary to retinal detachment, vitreous hemorrhage, and amblyopia in childhood presented with decreased vision in his left eye. He first noted blurry vision and difficulty focusing in the left eye 3 weeks prior, associated with mild frontotemporal headaches. He denied fatigue, eye pain, floaters, neck stiffness, jaw claudication, swollen joints, or rash. Persistent symptoms caused him to be seen by several optometrists and retinal specialists. CRP and ESR were mildly elevated, and MRI of the orbits was normal. His ophthalmic exam was thought consistent with bilateral anterior ischemic optic neuropathy possibly due to GCA, and he started high-dose prednisone. One dose of prednisone yielded no improvement in symptoms and he presented to the hospital for further management. Physical exam was notable for normal vitals, mild left temporal tenderness, bilateral blurred disc margins, and 20/40 visual acuity in the left. Initial labs including CBC, CMP, TSH, ANA, RF, and urine drug screen were within normal limits. CRP and ESR had normalized. A lumbar puncture showed normal opening pressure, glucose, and protein, and 2 WBC's. After consultation with Neurology, Ophthalmology and Rheumatology, the etiology of his vision loss was thought most likely atypical GCA versus infection, and high-dose prednisone was continued. An MRI head/neck/orbits and CTV head were negative for any abnormalities. Additional labs were notable for non-reactive RPR, negative PPD, negative Bartonella serologies, elevated toxoplasma IgG but negative IgM, negative antibodies for neuromyelitis optica, and negative ACE. However, serum Lyme screen returned positive and due to concern for neuroborreliosis, IV ceftriaxone was started empirically after consultation with ID. Bilateral temporal artery biopsies were eventually negative for GCA. The patient was discharged on a rapid steroid taper and a 3-week course of IV ceftriaxone. Post-discharge, the Lyme Western blot returned with 9/10 IgG and 1/3 IgM bands. CSF Lyme PCR was negative, but CSF B. burgdorferi IgG and IgM were positive. He demonstrated marginal improvement at 3-week follow-up with ID, and so another week of IV ceftriaxone was added with the understanding that it might take months for his vision to improve. Of note, at that appointment, he did recall a large red rash over his inner thigh 2-3 months prior to presentation during the summer.

DISCUSSION: This case encourages the physician to consider a broad differential for vision loss in cases that do not fit the classical picture for GCA, paying particular attention to Lyme neuroborreliosis in endemic or prevalent areas. While ocular neuroborreliosis is very rare, optic neuritis is a more common manifestation among affected patients. In this case, GCA was deemed less likely given duration of symptoms and lack of significant vision loss. Factors more consistent with an infectious etiology included blurred disc margins on ophthalmic exam without evidence of increased intracranial pressure, suggesting papillitis rather than papilledema, and the wooded location of the patient's home.

Interestingly, the thigh rash that the patient recalled after hospitalization may have been erythema chronicum migrans of Lyme disease. To review, this patient met criteria for peripheral Lyme disease with a Western Blot positive for at least 5/10 IgG bands. Although 2/3 IgM bands are needed to be considered positive, Lyme disease can be confirmed by IgG alone. A Western Blot only positive for IgM suggests either early Lyme disease or a false-positive test, for which a repeat Western Blot in 30 days is recommended. While his CSF Lyme PCR was negative, the positive CSF Lyme serologies are thought to be a more sensitive test and clinched the diagnosis of neuroborreliosis. However, such positive CSF serologies must be interpreted with caution, as they may simply reflect a diffusion of serum antibodies into the CSF. The patient was treated with IV ceftriaxone given concern for CNS penetration, though general review of the literature reveals IV and oral regimens are equally effective. One multicenter, non-inferiority, blinded, and randomized trial by Ljstad et al. in Norway demonstrated no difference in subjective symptom improvement or post-treatment CSF cell counts for patients treated with IV ceftriaxone versus oral doxycycline. The generalizability of this study may be limited, as the strains of *B. burgdorferi* endemic to Norway are different from that seen in the United States. Additional randomized studies are sparse, and there are no clear guidelines regarding duration of antibiotics. This case represents an interesting presentation of CNS involvement of Lyme disease, as well as an excellent chance to review the options for therapy.

BROADENING THE DIFFERENTIAL DIAGNOSIS OF ABDOMINAL PAIN TO INCLUDE SUMP-THING UNUSUAL Richard H. Zou¹, Thomas R. Radomski¹, Anna K. Donovan². ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh School of Medicine, Pittsburgh, PA. (Tracking ID #2194000)

LEARNING OBJECTIVE #1: Identify the differential diagnosis of right upper quadrant abdominal pain in patients who have undergone choledochoduodenostomy

LEARNING OBJECTIVE #2: Describe the diagnosis and management of biliary sump syndrome

CASE: A 42 year-old female with a history of choledocholithiasis status post cholecystectomy complicated by common bile duct injury requiring a side-to-side choledochoduodenostomy presented with a chief complaint of right upper quadrant abdominal pain for 1 day. The pain was colicky in nature, radiated to her back and right shoulder, lasted approximately 15–20 min, and was aggravated by oral intake. She first experienced similar symptoms 2 years earlier and then 3 additional times since then, with each instance lasting no longer than 30 min. During a prior admission, she was diagnosed with reflux cholangitis after undergoing an ERCP that demonstrated a widely patent choledochoduodenostomy, and was managed with a 10-day course of amoxicillin-clavulanic acid. On review of systems, she denied fevers, chills, nausea, vomiting, jaundice, pruritis, or chest pain. She noted a maternal family history of gallbladder disease. The patient's physical examination revealed a middle-aged appearing female in no acute distress. She was afebrile with stable vital signs. She had normoactive bowel sounds and a soft abdomen. Her abdominal exam was remarkable for moderate tenderness to palpation of the right upper quadrant and epigastrium. No rebound tenderness, guarding, fluid wave, or masses were appreciated. Murphy's sign was negative. The remainder of her examination was unremarkable. Labs revealed AST 321 IU/L, ALT 197 IU/L, Alk Phos 64 IU/L, gGTP 72 IU/L, and TBili 0.9 mg/dL. Amylase and lipase levels were within normal limits. A basic metabolic panel and complete blood count were unremarkable. Serologic testing for hepatitis A, B, and C; anti-smooth muscle antibodies; anti-mitochondrial antibodies; and total immunoglobulins was negative. MRCP showed no evidence of biliary ductal dilatation or choledocholithiasis. She was given bowel rest with fluid resuscitation and analgesia. Gastrointestinal medicine was consulted, and the patient was diagnosed with an acute flare of biliary sump syndrome as a result of her mild transaminitis, unremarkable MRCP, and surgical history. She was started on an empiric 5-day course of amoxicillin-clavulanic acid given her history of reflux cholangitis. Her abdominal pain improved after intravenous fluids and bowel rest, followed by slow advancement to a low-fat diet. She was discharged on hospital day 2.

DISCUSSION: Right upper quadrant abdominal pain is a common clinical presentation; however, a history of choledochoduodenostomy warrants special consideration when developing the differential diagnosis. Choledochoduodenostomy is a surgical procedure in which a passage is created between the common bile duct and duodenum, with the formation of a "blind sac" between the anastomosis and the ampulla of Vater. This procedure is indicated for the definitive correction and treatment of recurrent choledocholithiasis, common bile duct injury during cholecystectomy, and obstructing pancreatic head carcinoma, among others. Complications of choledochoduodenostomy that present as right upper quadrant abdominal pain include biliary sump syndrome, reflux cholangitis, ascending cholangitis, and alkaline reflux gastritis. Biliary sump syndrome is a late complication of side-to-side choledochoduodenostomy, resulting in the accumulation of food and debris in the distal common bile duct between the anastomosis and the ampulla of Vater as this "blind sac" becomes excluded from physiologic drainage of bile. Obstruction of the sphincter of Oddi with food, cholesterol stones, or static bile serves as a nidus

for bacterial proliferation leading to complications such as ascending cholangitis, recurrent pancreatitis, and liver abscesses. Clinical signs and symptoms include intermittent pain and tenderness of the right upper quadrant most pronounced after meals, recurrent cholangitis, fevers, chills, nausea, vomiting, and jaundice. In rare cases, steatorrhea secondary to absent intestinal bile salt secretion may be the initial presentation. Diagnosis is made with a high index of clinical suspicion, and can be confirmed with imaging modalities such as plain film, sonography, upper GI series, high-resolution CT scan, and/or hepatobiliary scintigraphy. In most cases, ERCP is required for definitive diagnosis. Current guidelines recommend ERCP with removal of debris and concomitant endoscopic sphincterectomy in the distal common bile duct as the gold standard for the treatment of biliary sump syndrome. Alternatively, percutaneous transhepatic cholangiography or EUS-guided choledochoduodenostomy have been utilized with success in cases refractory to ERCP treatment. Postoperative re-stenosis has been reported in up to 19 % of patients, requiring repeat papillotomy.

CALCIPHYLAXIS: CLINICAL MANIFESTATION AND MANAGEMENT Shenelle-Marie Wise, Marlowe Maylin. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198349)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of and risk factors for calciphylaxis

LEARNING OBJECTIVE #2: Identify the differential diagnosis for calciphylaxis and its appropriate diagnostic evaluation and treatment.

CASE: A 51-year-old man presented with 1 month of progressively painful eschars on his toes, fingers, and penis. He first noticed ulcers at the tip of his penis, his right second and third fingers and his right second toe. Within a month it became necrotic and 3 days prior to admission it was painful. On presentation, his vital signs were normal and physical exam revealed 1–2 cm necrotic eschars on the tips of his penis, his second toe of his right foot and the second and third finger of his right hand. The patient has a history of end stage renal disease and coronary artery disease and receives dialysis twice weekly. His phosphorus level was 9.6 mg/dL, calcium was 8.9 mg/dL, and parathyroid hormone level was 100 pg/mL. X ray of his right foot and hand revealed extensive soft tissue vascular calcifications. Given his history of end stage renal disease with elevated calcium and phosphorus product and worsening pain and necrosis of his extremities, he was diagnosed with calciphylaxis. He was treated with daily hemodialysis and phosphate binders to decrease his calcium and phosphorus levels.

DISCUSSION: Calciphylaxis is a rare disorder characterized by systemic calcification of the arterioles leading to ischemia and subcutaneous necrosis. It affects 1–4 % of the population with end stage renal disease (ESRD) and has a mortality rate of 60–80 %. Given its rarity but high mortality, internists should consider this diagnosis in patients with chronic renal failure who develop a sudden onset of painful necrotic ulcers. Limited data is available regarding the incidence of calciphylaxis in those without ESRD. Patients with nonuremic calciphylaxis frequently have a history of primary hyperparathyroidism, malignancy, alcoholic liver disease, underlying connective-tissue disease or pro-inflammatory conditions that lead to vascular calcification. Lesions of calciphylaxis typically develop suddenly and progress rapidly. They are often violaceous subcutaneous nodules that progress to ischemic ulcers with eschars that can become super-infected. They generally occur on the lower extremities; however lesions may also develop on the hands and torso. Intense pain is a common finding. There are no specific laboratory findings to diagnose calciphylaxis. Laboratory values often show a trend of increasing calcium x phosphate (Ca x P) product and parathyroid hormone (PTH) levels. Plain radiography uniformly demonstrates vascular calcification within the dermis and the subcutaneous tissue, which is not specific for calciphylaxis. Bone scintigraphy may be used as a noninvasive diagnostic tool to show the extent of calciphylaxis lesions. Calciphylaxis can be definitively diagnosed by a skin biopsy. An incisional cutaneous biopsy is usually diagnostic, as ample subcutaneous tissue is needed for diagnosis. Once diagnosed all patients should undergo an aggressive program of wound care, adequate pain control, and avoidance of local tissue trauma. Underlying abnormalities in plasma calcium and phosphorus concentrations in patients should be corrected, with lowering of the calcium x phosphate (Ca x P) product below 55 mg/dL. For ESRD patients, daily dialysis for seven days followed by five to six times per week is recommended until resolution of symptoms.

CAN'T CANDY CRUSH IT: A CRYPTIC PRESENTATION OF A DEMYELINATING DISORDER Lello Tesema, Priyank Jain, Rachel Nardin, Shruti Sonni. Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2199728)

LEARNING OBJECTIVE #1: Describe a systematic approach to differentiating demyelinating conditions.

LEARNING OBJECTIVE #2: Highlight the distinction between acute disseminated encephalomyelitis (ADEM) and multiple sclerosis (MS).

CASE: A previously healthy 32 year old woman presented to her PCP in late April with difficulty concentrating. She worked as a federal air marshal. She first noted her symptoms on a flight home from London during which she experienced difficulty with color recognition of the characters of the online game "Candy Crush Saga." She reported feeling overwhelmed with stress, which she attributed to sleep deprivation. Review of systems was remarkable for subjective fever at the airport prior to her flight. PMH was notable for migraine with aura, shift phase sleep disruption and a prior rugby related concussion. On examination, she was anxious and distressed, but answered questions appropriately. Visual examination revealed intact acuity but impaired peripheral vision. Her neurological examination was benign. She was referred to Ophthalmology and Psychiatry. In the interval period, she had trouble recalling her passwords for work. She presented to the ED for evaluation of these mental status changes. Head CT was unremarkable. She was diagnosed with migraine with aura and referred to a neurologist. Neurological evaluation demonstrated poor attention (difficulty with serial 7's), but normal short-term recall. Visual field, sensory, motor and coordination testing were entirely normal. Brain MRI with contrast revealed multiple mass-like hyperintense lesions in both cerebral hemispheres, subcortical white matter of both hemispheres (frontal and parietal) as well as temporal and occipital lobes (gray and white matter) measuring up to 3 cm. Cervical spine MRI showed multiple T2 weighted signal intensity foci within the spinal cord at C2, C4 and C6 measuring up to 3.4 mm. Infectious and inflammatory etiologies, including HIV, PML, sarcoid and Lyme, were excluded with negative laboratory and CSF studies (no pleocytosis, negative oligoclonal bands, positive myelin basic protein). Given the subacute course, in the setting of a possible viral prodrome and disseminated demyelination on MRI, and exclusion of other infectious process, the patient was diagnosed with ADEM. She received a course of IV corticosteroids and IVIG therapy with good effect. Four months later, she was re-admitted for new onset gait instability and facial sensory deficits. Repeat MRI showed new enhancing lesions and expansion of old lesions. CSF at this time revealed oligoclonal bands. She was diagnosed with MS and subsequently started on disease modifying therapy.

DISCUSSION: This patient presented with subacute encephalopathy, which has a wide differential diagnosis. The patient described was found to have multiple demyelinating lesions on brain and cervical spinal cord MRI. With demyelinating lesions, it is useful to classify them according to their pathogenesis: primary vs secondary (infectious, toxic, ischemic). Further differentiating between primary demyelinating disorders, which include ADEM, MS, neuromyelitis optica and transverse myelitis, requires careful consideration of the course of disease, presence of an antecedent infection or optic neuritis and the features of the demyelinating lesions. ADEM is an acute, widespread demyelinating condition that affects the brain and spinal cord. The challenge in this case was differentiating ADEM from a first occurrence of MS. ADEM is more common in children, and often presents after a viral prodrome. Associated fever and impairment of consciousness are more common in ADEM. In terms of neuroimaging, it is widely believed that distinguishing MS from ADEM based on a single MRI scan is virtually impossible[1], although seeing lesions of different ages may suggest MS. Although ADEM can progress in the acute phase, the appearance of new lesions on follow-up imaging suggests MS. CSF in ADEM may be normal or reveal pleocytosis, in contrast to cases of MS which rarely have pleocytosis. While detection of oligoclonal bands may be helpful in predicting a subsequent diagnosis of MS, the true utility is unknown since as many as 58 % of adults cases with ADEM have oligoclonal bands. The largest follow-up series of adult patients with ADEM found 35 % of patients developed clinically definite MS within the 12 months of initial presentation[2]. This fact should alert internists to closely monitor patients who carry a diagnosis of ADEM for new neurological symptoms that would trigger an evaluation for MS. 1. Singh S, Prabhakar S, Korah IP, et al. Acute disseminated encephalomyelitis and multiple sclerosis: magnetic resonance imaging differentiation. *Australas Radiol*2000; 44:404–11 2. Schwarz S, Mohr A, Knauth M, et al. Acute disseminated encephalomyelitis: a follow-up study of 40 adult patients. *Neurology*2001; 56:1313–18

CAN'T DECIDE, BUT REFUSING TO COMPLY Naomi Karlen; Kevin Attenhofer; Catherine Jones. Tulane University Health Sciences Center, New Orleans, LA. (*Tracking ID #2198781*)

LEARNING OBJECTIVE #1: Recognize that patients without capacity have the right to refuse

LEARNING OBJECTIVE #2: Understand the importance of adequately addressing challenging ethical cases

CASE: A 30 year-old woman presented with febrile neutropenia. She had multiple comorbidities including end-stage AIDS, end-stage renal disease, HIV encephalopathy, depression, and stage IV sacral decubitus ulcers. She required frequent admission for infections, altered mental status, and emergent dialysis, was formally evaluated by psychiatry on multiple occasions and was found to lack decision-making capacity. Her mother, who possessed power of attorney, continued to desire full treatment and declined

hospice care despite numerous discussions regarding the topic. The patient was again found to lack capacity but adamantly refused most medications, imaging procedures, and other diagnostic procedures. She slowly declined and died secondary to septicemia resulting from multi-drug resistant *Acinetobacter* from an unclear source.

DISCUSSION: Physicians are often tasked with caring for patients with psychological illness that may impede care and require psychiatric assessment. The terms "competence" and "capacity" are learned early in medical school and usually coincide with education about medical ethics. Those lessons cannot prepare clinicians for all of the variations of situations that they will encounter during practice. This case illustrates an interesting moral dilemma when posed with the question, "How do you approach a patient without capacity whose power of attorney requests treatment while the patient refuses treatment?" While many of the interventions requested by the power of attorney would aid in prolonging life, the diagnostic work-up and treatment would have been against the will of a combative patient, causing far greater risk to achieve the desired result. For example, a desired CT exam would have necessitated sedation in a patient with end stage renal failure and encephalopathy as the patient continued to refuse the imaging. Lack of decision-making capacity does not necessitate the pursuit of all interventions by physicians. The internist confronts the dilemma of "what is right" and "what is right for this patient." Moreover, the internist must keep in mind the principles of assent and consent. When patients do not have the capacity to consent (because they are children or adults who lack capacity), they must still assent to procedures. It is the physician's duty to secure that assent before proceeding. Acknowledging that there are no clearly correct answers in moral dilemmas is an important step in furthering our ability to deal with difficult situations as they arise. They are complicated and require an interdisciplinary team. A psychiatrist and an ethics committee as well as patient and family involvement can aid in making the right decisions in these difficult situations.

CANNABIS-INDUCED HYPERSENSITIVITY PNEUMONITIS: A CASE REPORT Matthew J. Miles; Andres Zirlinger. Lehigh Valley Health Network, Allentown, PA. (*Tracking ID #2185559*)

LEARNING OBJECTIVE #1: Recognize smoking cannabis as a risk factor for hypersensitivity pneumonitis.

CASE: A 64 year old male presented with worsening dyspnea, five pound weight loss, night sweats and dry cough for 2 weeks. He denied chest pain, fever or sick contacts. The patient was a former tobacco smoker, quitting 50 years prior to admission. He had a history of asthma with a recent admission for presumed asthma exacerbation which responded well to a short course of oral steroids. On admission his oxygen saturation was 92 % while breathing room air; physical exam was essentially normal except for bibasilar crackles. White cell count, liver and kidney function were normal. The initial chest X-ray showed bibasilar interstitial infiltrates so he was started on Vancomycin and Cefepime for presumed hospital acquired pneumonia. One day after admission he developed hypoxic respiratory failure secondary to acute respiratory distress syndrome which required invasive mechanical ventilation. A CT scan of the chest revealed bilateral ground-glass opacities. A bronchoscopy did not reveal any abnormalities of the airways. A bronchoalveolar lavage revealed primarily neutrophils without organisms. Bacterial blood cultures were negative, as were *Pneumocystis jirovecii*, respiratory viruses PCRs and HIV testing. Thus, he underwent a video-assisted thoracoscopic biopsy of the lung. The cultures and stains from the biopsy were negative for organisms; pathology revealed patchy areas of consolidation presented by a pattern non-caseating granulomas consistent with hypersensitivity pneumonitis. The patient was started on oral corticosteroids daily and was extubated two days after treatment. After extubation, the patient's daughter mentioned that the patient had been regularly smoking a significant amount of cannabis, but did not want anyone to find out. The patient's symptoms completely resolved after 8 weeks of corticosteroid therapy and cannabis cessation. A confirmation CT scan showed resolution of bilateral ground-glass opacities after 10 weeks of medical therapy. The patient continued to be asymptomatic 22 weeks after cessation of steroids and cannabis use.

DISCUSSION: Hypersensitivity pneumonitis is a complex syndrome caused by inflammatory mediated reaction in the lungs due to an external antigen. The more common antigens include molds, fungal spores, bacteria and yeasts. Diagnosing hypersensitivity pneumonitis relies several clinic features including: patient's history (cough, wheezing, weight loss, smoking history), physical exam (fever, crackles on pulmonary exam and digital clubbing) identifying microbiologic and environment exposures, bronchoalveolar lavage (lymphocytosis), CT scan (ground-glass opacifications), histopathology (non-caseating granulomas). Hypersensitivity pneumonitis can be treated with systemic corticosteroids and removal of the offending antigen. However, even with treatment, patient with hypersensitivity pneumonitis can develop chronic lung conditions such as pulmonary fibrosis and emphysema. The patient's history, physical exam findings, CT scan and biopsy are all supportive of the diagnosis hypersensitivity pneumonitis. The clinical improvement and the resolution of CT findings after 8 week of oral steroids and cannabis use cessation led us to conclude the diagnosis was hypersensitivity pneumonitis secondary

to cannabis smoking. The patient lives in a suburban area and denied any other exposures known to cause hypersensitivity pneumonitis. It is important to recognize hypersensitivity pneumonitis in urban and suburban patients that may have smoked cannabis and present with similar symptoms. There are multiple studies citing that cannabis can be contaminated with fungus that are known triggers of hypersensitivity pneumonitis. Bacteria linked to hypersensitivity pneumonitis have also been recovered from cannabis samples.

CAPNOCYTOPHAGA SEPSIS: A RARE DISEASE Muhammad Sarfraz Nawaz¹; Toufik Mahfood Haddad¹; Saraschandra Vallabhajosyula¹; Nikhil Jagan¹; Sunil K. Jagadesh^{1, 2}. ¹Creighton University School of Medicine, Omaha, NE; ²CHI Health Creighton University Medical Center, Omaha, NE. (Tracking ID #2199025)

LEARNING OBJECTIVE #1: Recognize *Capnocytophaga* as potential source of sepsis in appropriate clinical settings

LEARNING OBJECTIVE #2: Highlight management of sepsis related to *Capnocytophaga* infection

CASE: A 57-year old Caucasian male with history of stage IV non-small cell lung cancer, presented with lethargy and weakness over a period of 2 weeks, which was progressive and associated with anorexia and pain around his lips, side of the tongue and gums. He was unable to tolerate oral intake. His medications included vinorelbine, with last dose given 1 week before admission. Physical Examination revealed blood pressure 94/57 mm Hg, pulse 121/minute, a fatigued and cachectic male with poor dentition, disrupted oral mucosa, uninfected port site and generalized weakness without any apparent rash. Laboratory data revealed hemoglobin 6.3 Gm/dl, white cell count of 0.5/mm³, and absolute neutrophil count (ANC) of zero. He developed fever, hypotension and tachycardia during transfusion of the second unit of packed red cells requiring intravenous fluid resuscitation. Blood cultures were drawn and he was started on cefepime, vancomycin and filgrastim for febrile neutropenia with mucosal lesions. Being afebrile afterwards, vancomycin was discontinued on day three and filgrastim on day six once ANC was >500. Port site blood cultures grew gram-negative rods on day six, so infectious disease service recommended switching from cefepime to piperacillin-tazobactam empirically. Further identification revealed it to be *Capnocytophaga* species, related to his close exposure to dogs and cats at home. His dog used to lick his chest port and face. Repeat blood cultures showed no growth. On hospital discharge, he was switched to oral amoxicillin-clavulanate for a total of 3 weeks of antibiotics from the date of his bacteremic clearance. He remained afebrile on outpatient follow up.

DISCUSSION: The *Capnocytophaga* genus has nine species, with all being common to human and canine flora. However, only *Capnocytophaga canimorsus* causes severe infections in human beings, ranging from cellulitis to meningitis and endocarditis, and potentially septic shock, multiorgan failure and death.^{1,2} However, severe sepsis caused by *C. canimorsus* is extremely rare.² Risk factors include an underlying immune disorder, including splenectomy, chronic alcohol use, or cirrhosis.² However, 40 % of cases had no identifiable risk factor.^{1,3} Most infections occur in individuals older than 40 years.² Pathogenicity is not fully understood, but a substance inhibiting neutrophil motility has been identified, and may be associated with moderate resistance to phagocytosis.² Almost 80 % of patients report canine exposure, with 58 % being a bite, and 20 % report exposure without a bite or scratch (such as licking of broken skin).¹ Mortality from sepsis ranges from 25 to 30 %, but reaches up to 60 % in cases of septic shock. Patients with septic shock have a 30-day mortality of 60 %.^{1,2} Clinical features, depending on severity, include fever, chills, myalgia, vomiting, diarrhea, abdominal pain, dyspnea, mental confusion, and headache. After an incubation period of 1–7 days, patients can experience an abrupt onset of malaise, abdominal pain, confusion and shortness of breath, and can progress rapidly to severe septic shock. Physical examination might reveal a petechial rash on the trunk, lower extremities, and mucous membranes which can evolve from purpuric lesions to gangrene.² Since bacteria are extremely difficult to grow and up to 14 days of incubation might be necessary to detect growth on typical media; diagnosis is usually clinical based on history and physical findings.^{2,4,5} Abundant intra-cytoplasmic fusiform rods within neutrophils on peripheral blood smear may allow for a presumptive diagnosis in the appropriate setting.^{4,5} *Capnocytophaga* species infection responds well to penicillin and β -lactam- β -lactamase inhibitor combinations.⁵ Because of the relatively aggressive nature of *C. canimorsus* and the difficulty in obtaining a laboratory diagnosis, therapy should be started as early as possible.⁵ **References:** 1. Pers C, Gahm-Hansen B, Frederiksen W. *Capnocytophaga canimorsus* septicemia in denmark, 1982–1995: Review of 39 cases. *Clin Infect Dis*. 1996;23(1):71–75. 2. Oehler RL, Velez AP, Mizrahi M, Lamarche J, Gompf S. Bite-related and septic syndromes caused by cats and dogs. *Lancet Infect Dis*. 2009;9(7):439–447. 3. Meyer S, Shin H, Comelis GR. *Capnocytophaga canimorsus* resists phagocytosis by macrophages and blocks the ability of macrophages to kill other bacteria. *Immunobiology*. 2008;213(9–10):805–814. 4. Deshmukh PM, Camp CJ, Rose FB, Narayanan S. *Capnocytophaga canimorsus* sepsis with purpura fulminans and symmetrical gangrene following a dog bite in a shelter employee. *Am J Med Sci*. 2004;327(6):369–372. 5. Band RA, Gaieski DF, Goyal M, Perrone J. A 52-year-old man with malaise and a petechial rash. *J Emerg Med*. 2011;41(1):39–42.

CARDIOVASCULAR IMPLICATIONS OF MULTIPLE SCLEROSIS

Rekha Thammana. Emory University, Atlanta, GA. (Tracking ID #2195158)

LEARNING OBJECTIVE #1: Recognize inflammatory diseases as risk factors for cardiovascular disease.

LEARNING OBJECTIVE #2: Diagnose coronary artery disease syndromes in patients with characteristic electrocardiographic changes and negative biomarkers.

CASE: A 45 year old African-American man presents with episodes of new onset chest pain, shortness of breath, and sweating on exertion. These symptoms developed while mowing his girlfriend's lawn on a recent trip to Seattle, and similar symptoms occurred while pulling his suitcase through the airport on his trip home. His symptoms resolve with rest. He also notes that over the last few weeks, when he flexes his neck, he feels electric twinges in his legs bilaterally. He has started to develop bilateral leg weakness and his legs "give out" occasionally. His right thorax and forehead have suddenly become numb as well. Other than a childhood history of Bell's palsy with persistent R lower face weakness, he has no known medical problems. His sister was recently diagnosed with multiple sclerosis, and his father is deceased but had a stroke late in life. He is not a tobacco, drug, or alcohol user. He has no other significant medical history, medications, or complaints. His physical exam is significant for normal vital signs and unremarkable cardiovascular and pulmonary examinations. He has decreased sensation to light touch and pinprick along his right forehead and T10-T12 dermatomes on the right thorax, as well as decreased right lower facial strength. Initial lab work shows troponin-I peaking at 0.04 ng/mL and is otherwise unremarkable. An electrocardiogram (ECG) shows biphasic T-waves in V1 and V2 with t wave inversions in V3 and V4. Cardiac catheterization reveals a 100 % proximal left anterior descending coronary artery (LAD) occlusion with a 70 % ulcerated right coronary artery lesion and a 40 % left circumflex coronary artery lesion; other smaller lesions are present as well. MRI brain shows nonenhancing lesions in the right centrum semiovale, left corpus callosum, and cervical and thoracic cord most compatible with multiple sclerosis. Cerebrospinal fluid analysis reveals oligoclonal bands. He undergoes coronary artery bypass surgery and does well after surgery. No treatment is started for the diagnosis of multiple sclerosis during this hospitalization.

DISCUSSION: This case represents a seemingly unexpected combination of a first diagnosis of multiple sclerosis (MS) and coronary artery disease. Few studies are available to quantify the risk of cardiovascular disease (CVD) in patients with multiple sclerosis. Yet, multiple cross-sectional studies support the hypothesis that patients with MS have an increased risk of vascular disease within the first years of diagnosis, as is seen in our case. Autoimmune and other inflammatory diseases are also associated with enhanced atherosclerosis, believed to be due to immune-mediated processes. Several inflammatory pathways lead to the development of atherosclerosis, including macrophage and T cell activation. Activation of specific leukotriene pathways implicated in myocardial infarction (MI) are associated with genetic polymorphisms seen in multiple sclerosis. Investigation of the association between inflammatory diseases and CVD represents an area of growing research that has yet to be fully realized. Our case also demonstrates important features of cardiovascular medicine. Our patient's presentation of classic exertional angina is accompanied by negative biomarkers, but he does have characteristic electrocardiogram features suggesting coronary artery disease. Wellens and colleagues first described anterior T-wave changes suggestive of LAD occlusion in 1982, and later studies showed that these findings correlate with extensive anterior wall MI within several days of presentation. Wellens' syndrome includes a history of chest pain, normal or minimally elevated cardiac enzymes, and little or no ST segment changes and no Q waves. The key findings in Wellens' syndrome are deep T-wave inversions or biphasic T-waves in leads V1–V4, as seen in our patient. Wellens' syndrome illustrates an important warning in an era of overreliance on biochemical testing. These patients are very high risk for adverse events, but they do not usually have elevations of cardiac enzymes. While this patient had the characteristic findings of Wellens' syndrome, he fortuitously also had collateral vessel development from other coronary arteries that would have likely prevented an anterior wall MI. His symptoms on presentation were most likely associated with an occlusion of his right coronary artery. Above is a case of advanced atherosclerosis at a relatively young age (45) without classic risk factors of hypertension, diabetes mellitus, tobacco use, or significant family history of myocardial infarction. It illustrates the importance of recognizing non-classical risk factors for cardiovascular disease. These patients may require closer clinical scrutiny in order to evaluate them appropriately.

CARE FOR THE CAREGIVER: A CASE OF VTE AT THE BEDSIDE Jillian Roper; Jillian S. Catalanotti. The George Washington University, Washington, DC. (Tracking ID #2194028)

LEARNING OBJECTIVE #1: Recognize the heightened VTE risk in patients with IBD

LEARNING OBJECTIVE #2: Describe health risks associated with the caregiver role, and the role of providers in encouraging self-care to mitigate these risks

CASE: A 38-year-old woman with Crohn's disease presented to the emergency department with one day of severe persistent left thigh pain and swelling. She denied back pain, trauma or neurologic symptoms. She denied recent travel, surgeries or hospitalizations. She had no chest pain, dyspnea or cough; review of systems was otherwise unremarkable. She did not use alcohol, tobacco or drugs. Current medications included Canasa 1000 mg rectal suppository nightly and Apriro 0.375 g PO daily for Crohn's disease. Due to a change in her insurance formulary, she was recently changed from Delzicol to Apriro and noted increasing abdominal pain since time of medication change. Past medical history was otherwise unremarkable. Family history included inflammatory bowel disease (IBD) in her mother and son. There was no known family history of hypercoagulability disorders. On physical exam, vital signs were unremarkable; she was in no acute distress but appeared mildly anxious. Heart, lung, abdominal and neurologic examinations were normal. Her left thigh was mildly edematous without erythema. No cords were palpated. Labs were significant only for leukocytosis ($15.6 \times 10^9/L$) and thrombocytosis ($509 \times 10^9/L$). Venous ultrasound of the extremity confirmed unilateral deep venous thrombosis. INR, Factor V Leiden, protein C, protein S and Lupus anticoagulant were within normal limits. She was treated with enoxaparin 50 mg subcutaneously twice daily and warfarin 5 mg daily, and was discharged. On follow-up with her primary care physician, more detailed social history revealed that her son had a recent 9-week hospitalization for Crohn's flare. She reported remaining in his hospital bed to comfort him for days at a time while her husband brought food to the bedside.

DISCUSSION: Patients with IBD have a significantly increased risk of venous thromboembolic events (VTE). Recent meta-analysis of VTE in IBD patients suggests a two-fold increased risk as compared to the general population. While the greatest number of events occurs in patients older than 60, the relative increase in risk was greatest for patients less than 40 years. VTE in IBD patients tend to be unprovoked and in the outpatient setting. Although the mechanism of VTE in patients with IBD remains unknown, many speculate that it is due in part to the underlying inflammatory state inherent in the disease. Patients with IBD have high rates of VTE during flares, as in our patient. Traditional hereditary causes of hypercoagulability such as Factor V Leiden and protein C and S deficiencies do not occur in greater percentages in the IBD population, nor do valvular incompetency or venous obstruction. Patients with IBD and VTE often have additional risk factors beyond their baseline inflammatory risk, such as our patient's prolonged immobility. For this reason, providers should maintain a heightened awareness of VTE risk when patients with IBD develop additional VTE risk factors or are in an active IBD flare. This case also highlights the importance of caregiver health. In this case, our patient's baseline propensity towards VTE was augmented by her prolonged immobilization to comfort her hospitalized son. For parents of chronically ill children, highlighting the importance of parental well-being in connection to improved child health outcomes has been shown to motivate parents to seek personal help. Many caregivers experience a range of emotions including blame, anger, emotional stress and feeling selfish when they think to care for themselves. Caregivers may require validation and permission from health care providers to seek self-care. Who is responsible for care of the caregiver? Caregivers may have frequent contact with the health care system as advocates, but their own health needs may go unnoticed by providers who do not view them in the patient role. Greater attention to caregivers may be advantageous to optimize their health outcomes. Methods may include screening with validated questionnaires, referring to focus and support groups, and educating health care professionals regarding caregiver needs.

CATASTROPHIC COAGULOPATHY WITH THROMBOCYTOPENIA AFTER ENOXAPARIN—IT'S NOT ALWAYS HEPARIN INDUCED THROMBOCYTOPENIA *Garen J. DeCaro²; Rex Wilford¹. ¹Summa Health System, Akron, OH; ²Summa, Akron City Hospital, Brunswick, OH. (Tracking ID #2155874)*

LEARNING OBJECTIVE #1: Diagnoses other than heparin induced thrombocytopenia should be considered in patients who develop thrombocytopenia after receiving low molecular weight heparin.

CASE: Coagulopathy in cancer is relatively common. The standard treatment of venous thromboembolism in patients with cancer is low molecular weight heparin. However, heparin induced thrombocytopenia (HIT) is a known side effect of low molecular weight heparins and it should always be considered in any patient on a heparin product who develops new onset thrombocytopenia and thrombosis. The diagnosis should be confirmed using HIT antibody testing. We present a patient with clinically suspected HIT who suffered catastrophic hypercoagulable state due to underlying malignancy. A fifty one year old female recently diagnosed with metastatic lung adenocarcinoma and deep venous thrombosis (DVT) of the lower extremity presented with nausea, vomiting, bilateral flank pain and worsening cognition. Therapy for the malignancy had not been started yet, she had been started on enoxaparin 6 days prior to presentation in order to treat the DVT. The patient's platelet count had dropped from 313 thou/cmm at the time enoxaparin was started to 87 thou/cmm on the day of admission for the DVT. Her physical exam was without focal neurological deficits, but positive for bilateral flank pain to percussion and general

confusion. The abdominal CT showed multiple bilateral renal infarctions, splenic infarction and right hepatic artery embolus. MRI of the brain revealed innumerable areas of acute infarction throughout both cerebral and cerebellar hemispheres. HIT was tentatively diagnosed. Enoxaparin was discontinued and argatroban drip was started immediately with a rapid therapeutic PTT level reached. Review of peripheral smear by a hematologist revealed thrombocytopenia and no evidence of microangiopathic hemolysis. On day 3 of hospitalization the patient developed right sided hemiplegia and aphasia. CTA of the head and neck revealed no hemorrhage, multiple ischemic changes, and a filling defect in the superior vena cava thought to represent thrombus. Echocardiography suggested a right atrial mass concerning for thrombus. The patient developed seizures and respiratory failure and the family opted for comfort care. The patient died on day 7 of hospitalization. Pending workup revealed both anti-platelet factor 4 antibody and serotonin release assay to be negative, but a positive lupus anticoagulant test (LA-HexPhospholipid Neut).

DISCUSSION: This case illustrates ongoing, catastrophic, diffuse coagulopathy in a patient being treated presumptively for HIT. It is critical to determine the underlying pathological process in patients with thrombosis to best guide treatment. Lupus anticoagulant has been found more frequently in malignancy and is associated with increased thrombotic risk. Catastrophic hypercoagulable state of malignancy or antiphospholipid syndrome should be considered in patients with suspected HIT who continue to have thrombosis despite recommended therapy.

CAVITARY LUNG LESION: PRESENTATION OF HODGKIN LYMPHOMA

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<div id="__IF72RU4RKJAHUIYI_ONCE" style="display:none;"></div> Oluwaseun Shogbesan; Opeyemi Fadahunsi; Anene Ukaigwe; Adetokunbo Oluwasanjo. Reading Health System, West Reading, PA. (Tracking ID #2197676)

LEARNING OBJECTIVE #1: Recognize cavitory lung lesions as a presentation of Hodgkin lymphoma <div id="__if72ru4rkjahuiyi_once" style="display:none;"></div> <div id="__if72ru4rkjahuiyi_once" style="display:none;"></div> <div id="__if72ru4rkjahuiyi_once" style="display:none;"></div>

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CASE: Thirty-three year-old-male presented to the ED with productive cough, hemoptysis and intermittent low grade fever for 7 months. There was associated night sweats and a 10 lb weight loss. He had no history of recent travels outside of the United States, HIV infection or tuberculosis exposure. He had a 10-pack-year smoking history but denied alcohol use. He had been treated for pneumonia with four different courses of antibiotics outpatient. He reported marginal improvement in symptoms on antibiotics, but no complete resolution at any time. On physical examination, he was febrile, tachycardic and tachypneic but with normal oxygen saturation. A left non-tender 1 cm supraclavicular lymph node was found. Coarse breath sounds were noted in the left lung field. The rest of the physical examination was normal. Chest x-ray showed a mass like opacity in the left upper lobe and left perihilar region. Chest computed tomography (CT) scan revealed a large mass like consolidation in the left upper lobe with cavitation, bilateral pulmonary nodules and extensive mediastinal adenopathy. Laboratory data were remarkable for a white blood count of 32,000/microliter (normal: 4000 to 11,000/microliter) with lymphopenia and eosinophilia, microcytic hypochromic anemia, thrombocytosis and C-reactive protein of 13.26 mg/dl (normal: 0.00–0.70 mg/dl). Other laboratory tests including HIV, anti-neutrophilic cytoplasmic antibody, angiotensin converting enzyme assay, lactate dehydrogenase, and sputum for acid fast bacillus and culture were negative. Pathology of mediastinal biopsy obtained from a video mediastinoscopy confirmed classical Hodgkin lymphoma (HL), nodular sclerosing type. PET scan revealed extensive extralymphatic involvement and was categorized as stage IV. Despite receiving 8 cycles of ABVD (adriamycin, bleomycin, vinblastine, and dacarbazine) chemotherapy, the cavitory lung mass persisted. Consequently, a video assisted thoracic surgery wedge resection of the lung mass was done, which also confirmed HL. He is presently undergoing salvage chemotherapy with ifosfamide, carboplatin and etoposide, and he is being evaluated for autologous bone marrow transplantation. <div id="__if72ru4rkjahuiyi_once" style="display:none;"></div> <div id="__if72ru4rkjahuiyi_once" style="display:none;"></div> <div id="__if72ru4rkjahuiyi_once" style="display:none;"></div>

DISCUSSION: Pulmonary involvement in HL is not uncommon, about a fifth of cases involve the lungs at diagnosis. Most cases of lung involvement usually involve mediastinal adenopathy before progressing to the lung parenchyma as nodules, mass-like consolidations and rarely, cavities. Cavitory lung lesion has a broad differential, including tuberculosis, abscess, bronchial carcinoma, metastatic lung nodules, fungal infections,

bronchiectasis, pulmonary infarction, Wegener's granulomatosis, and pulmonary sequestration. Lymphadenopathy as seen in HL is a common feature in most of these differentials. Hence, can be a diagnostic dilemma. Our patient was treated over a 7-month period with antibiotics for pneumonia with little to no response. However, the persistence of respiratory symptoms, fever, and lung mass resulted in further evaluation and eventual diagnosis of HL. Poor response to appropriate antibiotics with persistence of cavitary lung mass should prompt exploration of viable differential diagnosis, guided by clinical data. Our index case highlights HL presenting as recurrent pneumonia-like symptoms, persistent cavitary lung lesion despite appropriate antimicrobials, and radiologically significant lymphadenopathy in a chemotherapy-naïve patient. Biopsy of lymph node or lung lesion might be required for final diagnosis. <div id="__if72ru4rkjahiuyi_once" style="display:none;"></div><div id="__if72ru4rkjahiuyi_once" style="display:none;"></div><div id="__if72ru4rkjahiuyi_once" style="display:none;"></div>

CEFEPIME INDUCED NEUROTOXICITY IN A PATIENT WITH RENAL DISEASE Victoria Forbes; Hamid Habibi; Roy Sittig. University of Connecticut Health Center, Farmington, CT. (Tracking ID #2194613)

LEARNING OBJECTIVE #1: Recognize the neurotoxic effects of cefepime especially in the background of renal impairment

CASE: Our patient is a 79-year-old female with extensive past medical history who presents with progressive and persistent left eye swelling and pain. Her past history includes congenital albinism, autoimmune retinitis on IVIG, chronic kidney disease, Sjogren's syndrome, Non-Hodgkin lymphoma, and chemotherapy-related myeloid neoplasm. Recently, she was seen by her Oncologist for right lower extremity swelling and treated with Keflex. At this time, she also complained of left eye swelling and edema. She was referred to her Ophthalmologist who diagnosed her with cellulitis of the left eye and initiated treatment. Swab cultures from the eye grew *Pseudomonas aeruginosa*. Her pain and swelling worsened despite treatment, prompting her to seek care in the ER. A CT scan revealed left orbit soft tissue inflammation compatible with orbital cellulitis. She was treated with IV vancomycin and cefepime. A subsequent MRI of the brain demonstrated left orbital cellulitis affecting all three compartments without a drainable abscess. Thus, she was maintained on the same antibiotic regimen. Her left eye began to improve on Ophthalmoscopic evaluation. However, she developed low to high-grade fevers. Given the clinical improvement of her original source of infection, other possible causes of her fevers were entertained. Cultures from the blood, eye, and urine were sent as well as a chest x-ray and ultrasound to evaluate for DVT. All proved to be negative. Her renal function remained significantly impaired. She was found to be acutely lethargic with altered mental status. An MRI and MRA of the head, EEG, and a lumbar puncture were pursued. Scans showed marked improvement of her left eye edema. When exploration into potential causes of her encephalopathy was unrevealing, her cefepime was discontinued. After discontinuation of cefepime, her mentation began to improve. Fortunately, her orbital cellulitis gradually resolved and her mental status returned to her baseline prior to her discharge from the hospital.

DISCUSSION: Cefepime, a fourth generation parenteral cephalosporin, is a commonly prescribed antibiotic with an expanded spectrum of activity against gram-positive and gram-negative microbes. The drug is eliminated primarily by the kidneys with ~85 % of the dose excreted in the urine. Drug accumulation can occur in patients with renal impairment. Neurotoxicity from cefepime has been reported to manifest as encephalopathy with or without myoclonus, seizures, hallucinations, coma, or nonconvulsive status epilepticus. The ensuing metabolic-toxic encephalopathy that can occur can be fatal with many reported cases resulting in death. Studies have estimated that it takes ~5 days from the time of administration of the drug to the onset of symptoms. Diagnosis can be especially challenging given the myriad of confounding factors causing encephalopathy such as infection, pain, age, comorbidities, electrolyte abnormalities, administration of multiple medications, and hospitalization. Our patient developed altered mental status in the setting of all the aforementioned confounders. During investigation into alternate causes, antibiotic-induced neurotoxicity was researched and considered. After discontinuation of cefepime, her mentation began to improve and eventually returned to baseline. Although recognized in the literature, cefepime induced neurotoxicity is a widely underappreciated and underdiagnosed phenomenon that can lead to encephalopathy, myoclonus, seizures, and death. The toxicity is especially prevalent in patients with impaired renal function, but has been reported to occur in patients with normal renal function. Discontinuation of cefepime should occur in encephalopathic patients if investigation into alternate diagnoses proves unfruitful. In addition, patients with impaired renal function require a dose adjustment to minimize the risk of neurotoxic sequelae. In conclusion, we must be aware of the propensity of cefepime to produce acute, severe neurotoxicity that can lead to significant morbidity and mortality.

CEREBRAL MYCOTIC ANEURYSM AND SPONTANEOUS SUBDURAL HEMATOMA IN A PATIENT WITH SUBACUTE VIRIDANS STREPTOCOCCI ENDOCARDITIS Shalina Mirza; Jessamyn Blau; Albert Ackil. University of Washington, Seattle, WA. (Tracking ID #2200958)

LEARNING OBJECTIVE #1: Recognize that the development of a cerebral mycotic aneurysm resulting in spontaneous subdural hematoma is a known, but rare, complication of endocarditis.

LEARNING OBJECTIVE #2: Identify key features of a history that raise suspicion for endocarditis, even in the absence of typical clinical signs and symptoms.

CASE: A 66-year-old African-American male with hypertension, mitral regurgitation, and GERD was admitted from the emergency department for severe anemia. He did not have any signs of active bleeding, but was hypotensive to 84/47 with a 10-point hematocrit drop from baseline. He reported that over the previous 3–4 months, he had developed nonspecific symptoms of fatigue, anorexia, early satiety, and a 30-lb weight loss. He denied fevers, chills, rashes, cough, night sweats, melena, or hematochezia. He denied IVDU. He had an episode the previous week of non-traumatic right ankle pain and swelling for which he presented to the emergency department. Radiographs of the ankle were normal, and he was told it was a soft tissue injury. At that time, he had no other localizing signs or symptoms concerning for endocarditis. At the time of presentation, he was afebrile and hypotensive but not tachycardic. He was thin and ill-appearing. His lungs were clear, and he had a grade 4/6 holosystolic murmur appreciated best at the apex with radiation to the axilla. There were no signs of heart failure. He had no palpable lymphadenopathy. His right ankle was diffusely swollen, tender, and warm to touch. His nail beds were pale, but there was no documentation of the presence of either splinter hemorrhages or Janeway lesions. His neurologic exam was normal, and the rest of the exam was unrevealing. Laboratory studies were significant for a leukocytosis of 15.8 with a left shift, microcytic anemia of 21.6 with an MCV of 65.3, and a thrombocytosis of 493. After IV fluids, his blood pressure normalized. At this point, there was suspicion for occult GI blood loss and malignancy. An EGD and colonoscopy were scheduled and the patient began colonoscopy prep on hospital day 1. Meanwhile, blood cultures from admission were positive in less than 24 h with 2 of 2 bottles growing Gram-positive cocci. He was started on IV vancomycin for bacteremia of an unknown source. Transthoracic echocardiogram revealed severe mitral regurgitation similar to his previous study, but no vegetations were visualized. Further chart review revealed he had dental work completed one year prior to presentation, but he appropriately received bacterial prophylaxis given his known valvular heart disease. In the evening of hospital day 1, he remained hemodynamically stable and afebrile, with a normal neurologic exam. Early on hospital day 2, the patient was found unresponsive and tachypneic lying in bed. His neurological exam was significant for minimal response to painful stimuli and sluggish pupils. This progressed quickly to decorticate posturing with fixed and dilated pupils. CT head revealed a large left-sided, acute subdural hematoma with 2 cm midline shift and descending transtentorial herniation. After discussion with his wife, no surgical intervention was taken. He was placed on comfort measures and died later that day. Autopsy determined the cause of death was a ruptured mycotic aneurysm, which developed secondary to high-grade bacteremia from subacute *Viridans Streptococci* endocarditis.

DISCUSSION: This patient's cause of death was unknown until the autopsy, and endocarditis was not suspected at the time of presentation. Subacute bacterial endocarditis can present insidiously with non-specific constitutional symptoms. Misdiagnosis can be life threatening. Therefore, it is important to have a high clinical suspicion for this disease especially in patients with known valvular pathology even in the absence of vegetations on echocardiogram. *Viridans Streptococci* is a known cause of endocarditis, and it has propensity to affect the native, mitral valve. Neurologic sequelae are a rare complication of endocarditis with ischemic stroke being most common. By contrast, there are very few reports of mycotic aneurysm rupture and subdural hematoma as a consequence of endocarditis. This case illustrates the need for high clinical suspicion for subacute endocarditis, and specifically for the devastating and heterogeneous presentation of neurologic sequelae.

CERTAINLY SIRS, BUT SEPSIS MISSES THE SWEET SPOT Christian Ngo; Oanh K. Nguyen. UT Southwestern Medical Center, Dallas, TX. (Tracking ID #2196664)

LEARNING OBJECTIVE #1: Recognize the systemic inflammatory response syndrome (SIRS) as a manifestation of non-infectious illness in the ICU.

LEARNING OBJECTIVE #2: Recognize the role of cognitive biases in diagnostic errors.

CASE: A 55 year-old man with a history of hypertension and hypothyroidism presented with 2 weeks of progressive malaise, weakness, and anorexia culminating in an acute episode of dyspnea and lightheadedness. Review of systems was notable for unintentional weight loss of 20 lbs. and acute on chronic shoulder, knee, and elbow pain. Family history

was significant for type 2 diabetes mellitus in his mother. Social history was notable for limited English proficiency and occupation as a roofer, though he had been recently unable to work due to joint pain. Initial vitals were temperature 34.7 °C, blood pressure 101/59 mmHg, pulse 87 beats/min, respiratory rate 20 breaths/min, and oxygen saturation 98 %. Initial physical exam documented normal sensorium and right upper extremity weakness; musculoskeletal exam was deferred. Initial laboratory evaluation showed serum glucose 983 mg/dL, anion gap 23, creatinine 3.34 mg/dL, white blood cell count 7.65, thyroid stimulating hormone 1.11 mIU/mL. A diagnosis of diabetic ketoacidosis (DKA) was made, with concern for infection as a precipitating factor. The patient was transferred to the intensive care unit, started on an insulin drip, intravenous fluids, and broad spectrum antibiotics. The patient subsequently became febrile to 39.4 °C with tachycardia to 104 beats/min and intermittent episodes of hypotension as low as 87/55 mmHg. Hypotension spontaneously resolved within 24 h, but fevers, tachycardia and weakness persisted. Further evaluation for an infectious source, including blood, urine, and stool cultures, chest radiograph, transthoracic echocardiogram, lumbar puncture, and computerized tomography of the chest, abdomen, and pelvis were unrevealing. Antibiotics were nonetheless further broadened to empirically treat presumed occult infection. Nerve conduction studies showed axonal sensorimotor polyneuropathy consistent with mild diabetic neuropathy. On hospital day six, the patient was transferred to the floor with a diagnosis of 'fever of unknown origin and generalized weakness.' On further questioning, the patient clarified that his 'weakness' entailed difficulty walking and lifting his arms due to pain in the upper extremities and left knee. Subsequent exam revealed warmth, erythema, and swelling of bilateral shoulders, elbows, wrists, left 2nd MCP, right 2nd and 3rd PIPs, 4th and 5th MCPs. Firm 1.5 cm irregular nodules were noted over the left 2nd and right 4th MCPs. Arthrocentesis of the right 2nd MCP showed negatively birefringent crystals consistent with gout. Prednisone, colchicine, and allopurinol were initiated for acute gouty arthritis with resolution of fevers and weakness.

DISCUSSION: Though infection is a common precipitant of DKA, patients with DKA can also present with signs of SIRS (including hypothermia, tachycardia and hypotension) in the absence of infection, due to peripheral vasodilation, volume depletion, and acidosis. Fevers in the context of polyarthralgias may portend septic arthritis but should also raise the possibility of inflammatory and crystal arthropathies. While it is prudent to empirically treat for infection in the setting of DKA without known precipitants, the lack of leukocytosis, localizing signs of infection, or response to antimicrobials, and the presence of important additional clues in the history and physical should have raised the possibility of alternative, non-infectious etiologies for SIRS in this patient. Several cognitive biases led to a diagnostic delay in this case: premature closure, anchoring, and framing effect. Premature closure is the acceptance of a diagnosis before it is fully verified. Here, the presumed diagnosis was sepsis and there was a failure to evaluate additional findings inconsistent with this diagnosis. Anchoring is the tendency to rely too heavily on the first piece of information offered. Here, anchoring to the diagnosis of sepsis led to a subsequent evaluation narrowly focused only on identifying an occult source of infection, rather than broadly evaluating for alternate etiologies of SIRS. Finally, framing of SIRS as an infectious issue and weakness as a neurologic rather than a musculoskeletal issue led to unnecessary testing, prolonged hospitalization, and a near miss in the diagnosis of a common and treatable condition, acute gouty arthritis. In conclusion, internists should recognize that manifestations of SIRS can occur in the setting of non-infectious illnesses, such as DKA and unrecognized acute gouty arthritis. This case specifically illustrates the need to recognize non-infectious causes of abnormal vital signs to guard against potential diagnostic errors arising from premature closure, anchoring, and framing effects.

CHANGE OF HEART Stephanie Hon. Tufts Medical Center, Boston, MA. (*Tracking ID #2199187*)

LEARNING OBJECTIVE #1: Illustrate the importance of recognizing a rare condition (cardiac amyloidosis) that requires prompt treatment to minimize the risk of morbidity and death.

LEARNING OBJECTIVE #2: Differentiate key clinical and diagnostic features between ischemic cardiac disease and cardiac amyloidosis in heart failure

CASE: A 65-year-old man with PMH of CAD status post drug-eluting stent to the distal left circumflex artery a year ago, presented to the ED with 5 days of progressive dyspnea on exertion associated with chest pressure that resolved with rest and sublingual nitroglycerin. Physical examination revealed tachycardia (110 s), orthostatic hypotension and hypoxia (91 % on room air). The patient appeared volume overloaded with bibasilar rales and bilateral pitting edema. Laboratory data was notable for troponin 0.04 and pro-BNP 5613. Chest x-ray showed mild pulmonary vascular congestion and EKG revealed low voltage, normal anteroposterior Q waves and lateral ST depressions. Echocardiography noted severe concentric biventricular hypertrophy with EF 35 %. Given the high suspicion for CAD, LHC was performed and revealed a 50 % ostial lesion and questionable proximal LAD lesion. P-MIBI NM stress test confirmed no new ischemic territories. Given the severe concentric biventricular hypertrophy on echocardiography, he underwent RHC and

3 endomyocardial biopsies. Tissue stained with congo red revealed characteristic apple-green birefringence under polarization microscopy, consistent with amyloidosis. SPEP and UPEP demonstrated moderate hypoalbuminemia and a restricted band located in the gamma region consistent with a monoclonal immunoglobulin as well as presence of Bence-Jones protein, respectively. Immunofixation electrophoresis revealed a monoclonal IgA type lambda gammopathy, confirmed with liquid chromatography tandem mass spectrometry for the diagnosis of light chain (AL) amyloidosis.

DISCUSSION: AL amyloidosis is a systemic disease characterized by extracellular accumulation of insoluble protein fibrils produced from clonal plasma cells in the bone marrow. Without treatment, cardiac involvement portends a median survival of 6 months. The progression of diastolic dysfunction caused by diffuse infiltration of myocardium with resultant stiffening and impaired relaxation leads to systolic dysfunction as functional myocardial tissue is replaced with amyloid protein. Amyloid infiltration can affect the conduction system leading to arrhythmias or sudden death. EKG typically shows low voltage, pseudoinfarct patterns and arrhythmia, while TTE reveals concentric biventricular hypertrophy, valvular thickening and biatrial enlargement. Troponin and BNP provide diagnostic and prognostic information as both are elevated in cardiac AL amyloidosis, often to a degree that appears disproportionate to CHF symptoms. Studies suggest that elevated troponins may surpass symptomatic CHF and TTE findings as predictors for survival and reflect treatment progress(1). Heart transplantation with adjunctive chemotherapy has shown some survival benefit and sequential heart and stem cell transplantation has shown significant survival benefit in certain patient populations(2,3). This case exemplifies the potential for anchoring bias, described as the tendency to rely too heavily on the first piece of information offered. Although CAD has a high pre-test probability as the etiology of this patient's CHF given his prior history, the nuances in EKG and TTE were suggestive of infiltrative disease. Astute observations prompted for timely pursuit of a diagnosis of cardiac amyloidosis. This case demonstrates a classic clinical presentation of congestive heart failure of amyloidosis, and should serve as a reminder to pursue alternative diagnoses when evidence does not support the original theory. Change of heart regarding this patient's change in his heart gave him the opportunity for better survival. 1. Dispenzieri A., Kyle R.A., Gertz M.A.; Survival in patients with primary systemic amyloidosis and raised serum cardiac troponins. *Lancet*. 361 2003:1787–1789. 2. Gillmore JD, Goodman HJ, Lachmann HJ, et al. Sequential heart and autologous stem cell transplantation for systemic AL amyloidosis. *Blood* 2006; 107:1227–9 3. Maurer MS, Raina A, Hesdorffer C, et al. Cardiac transplantation using extended-donor criteria organs for systemic amyloidosis complicated by heart failure. *Transplantation* 2007; 83:539–45

CHIKUNGUNYA FEVER IN A RETURNING TRAVELER: A NEW CHALLENGE FOR PRIMARY CARE IN THE WESTERN HEMISPHERE Camelo J, Blanquicett¹; James H. Willig^{1, 2}; Mukesh Patel². ¹University of Alabama at Birmingham, Birmingham, AL; ²Baptist Health System, Birmingham, AL. (*Tracking ID #2198620*)

LEARNING OBJECTIVE #1: Recognize the clinical presentation of Chikungunya fever, an emerging infection in the Western Hemisphere

CASE: A previously-healthy 36 year-old man presented with fever of 101 °F, malaise, headache and joint pain, four days after returning from a week-long vacation in the Caribbean. On day 1, he reported vague, right elbow discomfort and fever. Hours later, he described polyarthralgias, particularly in the hands and feet, limiting his ability to walk and hold objects. On day 2, he noticed a faint erythematous rash on his trunk and extremities. Associated symptoms included blurry vision, fatigue, headache and difficulty sleeping. He denied cough, dyspnea, GI symptoms, bleeding or blood in urine or stool. The patient is married and has a 3 year-old child. He denied sick contacts, new sexual partners or tick bites. He reports numerous mosquito bites to exposed skin during vacation. By day 4, the rash was more pronounced and involved his palms and soles. He described noticeable swelling in his fingers and ankles and was unable to ambulate independently due to pain in the joints of his feet, ankles, knees, and hips. Past medical history included a sports-related, left shoulder injury with subsequent labrum repair and seasonal allergies. On day 2 of illness, his temperature was 100.1 °F, BP 130/73 mmHg, pulse 85 bpm, respiration rate 14. On exam, a morbilliform rash on the trunk and upper and lower extremities was visualized. Conjunctiva were slightly hyperemic, sclera anicteric. Tenderness to passive movement of the ankles and fingers was noted, in addition to tenderness over the lower cervical spine, lumbar spine and paraspinal muscles. No joint effusions or synovitis were detected, edema in bilateral ankles and all fingers was noted. By day 4 of illness, the rash was more erythematous, confluent and lesions were visible on the palms and soles. Laboratory included WBC 4.6/mm³ (56 % neutrophils, 24 % lymphocytes, 20 % monocytes). Hematocrit was 40 %. Electrolytes, coagulation studies and hepatic function tests were normal. Serologic studies for acute viral hepatitis, acute EBV, HIV, syphilis, and dengue were negative. HIV RNA was undetectable and blood cultures were negative. Blood PCR for Chikungunya was positive on day 2 of illness, confirming diagnosis. While treatment with NSAIDs led to some improvement over the subsequent 2 weeks, significant hand and ankle pain continued. Imaging was noncontributory. We

prescribed hydroxychloroquine which subjectively improved arthralgias. He was able to return to normal physical activity 4 months after infection.

DISCUSSION: A little more than a year after its introduction to the Caribbean, Chikungunya virus has caused hundreds of thousands of infections, become endemic in many countries, and has established itself in Southern Florida. Previously, only endemic regions in Africa and Asia were considered at risk for Chikungunya with occasional outbreaks noted as the virus spread to nonimmune populations. Infection may be asymptomatic and is rarely fatal. The Caribbean is one of the most popular international destinations for North Americans and most travelers are unaware of the new risk for Chikungunya transmitted via *Aedes* species mosquitoes, a vector shared with dengue viruses, which may be clinically indistinguishable. Unlike dengue fever, persistent debilitating fatigue and arthralgias may persist for months to years after acute Chikungunya infection. Internists should be aware of the presence of Chikungunya in our hemisphere and its presentation. Pre-travel counseling in methods to prevent mosquito bites is important for travelers to Chikungunya endemic regions, and in those who develop a febrile illness with rash and arthralgias, Chikungunya fever should be considered in the differential. We should also be aware of the potential for long-term musculoskeletal symptoms that can complicate recovery in some patients.

CHIKUNGUNYA INFECTION PRESENTING AS ACUTE PSYCHOSIS Kiruba Vembu¹; Pinky Jha²; Hari Paudel¹. ¹Medical College of Wisconsin, Milwaukee, WI; ²medical college of wisconsin, Milwaukee, WI. (Tracking ID #2199314)

LEARNING OBJECTIVE #1: Recognize the wide differential diagnosis for altered mental status and acute psychosis, including rare infectious causes

LEARNING OBJECTIVE #2: Identify the clinical presentation and rare neurologic complications of Chikungunya infection

CASE: A 53 year old female with recently diagnosed schizophrenia reported to the ED for continued hallucinations. Her husband stated that she reported shadows of a person intending to cut off her arms and legs; she also threatened to physically assault him. Urinalysis returned positive; she was started on nitrofurantoin and admitted to an inpatient mental health facility. Four days later, she reported to the ED again with a chief complaint of altered mental status. She continued to have symptoms, including sexually inappropriate behavior and significant agitation, despite a full course of nitrofurantoin and treatment with lorazepam and olanzapine. Vitals in the ED were as follows: blood pressure 129/65, pulse 90, temperature 37.1 °C, respiratory rate of 18 and oxygen saturation of 100 %. CT scan was negative for acute abnormalities. Patient was admitted for further workup. Additional history was obtained: she had taken a trip to Puerto Rico 2 months prior, and contracted Chikungunya infection. Five days after she initially reported symptoms, she reported significant paranoia, visual and auditory hallucinations, and persecutory delusions. She was treated with supportive care at that time. On admission, urine drug screen was negative. MRI was obtained and showed non specific attenuated nulling of CSF in the sulci. EEG was performed and showed no epileptiform discharges. She was continued on her antipsychotic medication regimen, and a lumbar puncture was performed due to concern for meningoencephalitis. Results were positive for both Chikungunya IgG and IgM; IgM titer returned at a level of 1:160.

DISCUSSION: The differential diagnosis for altered mental status, including acute psychosis, is wide and includes not only primary psychiatric illness but also metabolic disturbances, structural brain defects or lesions, endocrine and liver disease. Infectious causes must also be considered. We present a rare case of Chikungunya infection presenting with acute psychosis; this patient's symptoms were interpreted to be secondary to primary psychiatric illness before the differential diagnosis was expanded to consider rare causes of infection given her recent travel history to Puerto Rico. Chikungunya virus, an arbovirus endemic to west Africa and transmitted by the *Aedes* mosquito, has spread globally since 2004. Three types, based on geographical origin, have been identified to date. Typical symptoms of infection include fevers over 38.9 °C, severe arthritis, and a maculopapular rash. Diagnosis is obtained through detection of viral RNA or antibodies. Virus isolation can also be used when detected in the first 7 days of illness. IgM anti chikungunya bodies typically develop within 1 week, and as in our patient, stay elevated for up to 3 months. IgG antibodies can persist for years after initial infection. Neurologic symptoms of Chikungunya are rare. In early epidemics, meningoencephalitis had been reported, but more recent outbreaks have shown that palsies, acute flaccid paralysis, and Guillan Barre can occur with chikungunya infection. In adults, encephalopathy is most frequent, and is associated with IgM antibodies in CSF. However, literature search shows that psychosis associated with chikungunya is rare; previously, six cases were reported in a 1964 outbreak in southern India. Chikungunya infection was traditionally thought to have only significant morbidity. However, a Reunion island outbreak showed that mortality could be attributed to this infection as well, which had previously not been reported. Thus, further understanding of neurologic complications is essential. Treatment is mainly supportive; anti-inflammatory and antipyretic agents should be provided, along with appropriate pain control measures. To date, no antiviral agents have been proven to be effective.

CHIKUNGUNYA: A MICROBE ON THE MOVE Daniel C. Rogan¹; Jason A. Korcak. Montefiore Medical Center, Bronx, NY. (Tracking ID #2199082)

LEARNING OBJECTIVE #1: Recognize chikungunya fever as an emerging disease.

LEARNING OBJECTIVE #2: Describe the clinical presentation and diagnosis of chikungunya fever.

CASE: A 52-year-old man presented with generalized muscle and joint pain, headache, and subjective fevers for 1 day. The pain was most severe in the elbows and knees. The patient also reported one episode of non-bloody emesis, but denied rash, neck stiffness, sore throat, and abdominal pain. Three days prior to presentation, the patient returned from a trip to Puerto Rico. He visited only urban areas and reported a mosquito bite on his right ankle. The patient's past medical history was significant for HIV on ART with a recent CD4 count of 769 cells/μL and an undetectable viral load. The patient was afebrile with normal vital signs. Range of motion of bilateral elbows and knees was limited secondary to pain. There was no joint swelling or erythema. There was a lesion consistent with a mosquito bite over the medial right ankle, but no petechiae, purpura or other rashes. White blood cell count was 6.4 k/μL, and platelets were 209 k/μL. Blood cultures were negative. Dengue IgG was elevated, but IgM was normal. Chikungunya viral RNA was detected by RT-PCR.

DISCUSSION: From 2006 to 2013, an average of 28 people annually in the United States tested positive for the chikungunya virus. All were travelers from endemic areas, mostly in Southeast Asia, the Indian subcontinent, and sub-Saharan Africa. The first transmission of the chikungunya virus in the Western Hemisphere was reported during an outbreak in the Caribbean in December 2013. Just 4 months later, more than 31,000 cases of chikungunya were reported across the Caribbean. While the actual number is difficult to estimate as chikungunya is not a nationally reportable disease in the United States, a total of 2021 chikungunya virus disease cases have been reported in the United States during 2014. Eleven of these cases were locally transmitted in Florida. All other cases occurred in travelers returning from affected areas in the Americas. Chikungunya virus is transmitted to humans by the *Aedes aegypti* and *Aedes albopictus* mosquito. These mosquitoes are found throughout much of the Americas, including the United States, and also transmit Dengue virus, which shares several key clinical features with chikungunya. Testing serum by immunoassay and PCR can help differentiate between dengue and chikungunya. In this case, a positive dengue IgG in the absence of a positive dengue IgM is consistent with past infection. The diagnosis of chikungunya is usually based on the clinical presentation and travel history. In addition, there are plasma or serum assays for the chikungunya virus itself, viral nucleic acid, or virus-specific immunoglobulin (IgM) and neutralizing antibodies. After an incubation period from 2 to 12 days, chikungunya infections typically present with fever, malaise, headache, myalgia, and arthralgia or arthritis. There is involvement of both large and small joints, usually symmetric and often involving the hands and feet. Chikungunya is rarely fatal. Symptoms are generally self-limiting. Some patients may have persistent joint pains for months to years, and rarely, there may be ophthalmologic, neurologic, gastrointestinal, and cardiologic complications. Neonates and older adults typically experience more severe forms of the disease. Given its rapid emergence in the United States and the Caribbean, clinicians must consider chikungunya in the differential diagnosis for a broad range of patient presentations. Chikungunya is truly a microbe on the move.

CHIKUNGUNYA: A PREVIOUSLY UNCOMMON DIAGNOSIS IN THE AMERICAS Reece Doughty. David Geffen School of Medicine at University of California Los Angeles, Los Angeles, CA. (Tracking ID #2195848)

LEARNING OBJECTIVE #1: Recognize the clinical features of chikungunya virus infection

CASE: We present the case of a 33 year old female seen in the emergency room who developed fever, arthralgias and swelling in both wrists and ankles, and malaise 1 day after returning from Puerto Rico. She subsequently developed a rash as well as persistent mild nausea. She was previously healthy with no active medical conditions and no current medication use. She worked as a nanny and reported no recent sexual partners. She did not have a primary care physician and was not evaluated prior to her travel. She went to Puerto Rico for 8 days for vacation and spent most of her time at a resort condominium complex. She did not use insect repellent or take malaria prophylaxis and denied known insect bites or contact with animals while there. No one else in her travel group became ill. The patient was evaluated by our team after approximately 1 week of symptoms. The patient was afebrile during our initial exam, but was borderline tachycardic to the 90s. She was tender to palpation in both wrists and ankles and had enlarged tender posterior cervical lymph nodes as well as a diffuse, erythematous, blanching maculopapular rash over her trunk and extremities. Initial laboratory studies were significant for a mildly decreased WBC at 3.08 and mildly decreased bicarbonate at 19; otherwise, CBC, BMP, and LFTs were within normal limits. Bicarb improved with IV fluids. Subsequent investigation for HIV, dengue,

malaria, EBV, CMV, Rickettsial disease, and leptospira were negative. Patient had ongoing wrist and ankle pain, but otherwise did well during her admission and was discharged from the hospital on after 48 h with clinic appointment later in week to follow-up. Prior to this clinic appointment, chikungunya antibody studies returned positive with IgM 1:640 (nml <1:10) and IgG 1:20 (nml <1:10). She had ongoing wrist and ankle pain moderately controlled with tylenol, but otherwise felt at her baseline. Interestingly, she had mildly elevated measles antibodies that we suspect was due to cross-reactivity from chikungunya infection as the patient had been vaccinated in the past and had none of the characteristic symptoms suggestive of acute measles infection. We instructed her to follow-up with a new PMD closer to where she lives in and be re-evaluated in 1–2 weeks.

DISCUSSION: Chikungunya virus is a mosquito-borne viral disease which characteristically causes high fever and arthralgias, and may also cause rash, headache, myalgias, and GI complaints. After initial symptom onset, diagnosis can be made by PCR; after about 4–5 days, serum antibodies (IgM/IgG) can be detected. For health care providers in the Americas, chikungunya was previously a rarely seen travel related illness, but in the last 18 months has become an endemic disease in the western hemisphere with reports of autochthonous cases ranging from Florida through upper South America. As of mid-December 2014, there have been about 25,000 confirmed cases in the Americas as well as over 1,000,000 suspected additional cases. Although the disease course is self-limited in the vast majority of cases, and treatment is symptomatic, given the ongoing epidemic, it is important to differentiate this from other diagnoses such as dengue fever which can present similarly but can have severe complications such as bleeding and shock that are worsened by NSAID use.

CHRONIC, CUTANEOUS, AND CALCIFIED: NOT YOUR EVERYDAY ULCER

Brian J. Wentworth¹; Qasim Salimi¹; Julia Grimes². ¹Rutgers Robert Wood Johnson Medical School, Piscataway, NJ; ²Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ. (*Tracking ID #2153249*)

LEARNING OBJECTIVE #1: Recognize and treat calcinosis cutis in a patient with an autoimmune connective tissue disease (ACTD).

LEARNING OBJECTIVE #2: Recognize when biopsy is warranted for cutaneous ulcers.

CASE: A 37 year-old Indian woman with SLE/RA overlap syndrome and GERD presented with non-healing left lower extremity ulcers of 4 months duration unresponsive to cephalexin and levofloxacin. The ulcers began as raised, erythematous, and painful lesions that initially drained a thick, whitish fluid. Of note, the patient reported a five year history of similar slow-healing ulcers. Extensive rheumatologic workup prior to admission revealed positive or elevated levels of the following: ANA (speckled pattern), anti-Sm, RF, anti-CCP, SS-A, ACE, anti-RNP. A lower-extremity x-ray one year prior revealed subcutaneous calcifications. ROS revealed intermittent fevers, fatigue, dysphagia, arthralgia, morning stiffness, painful bilateral extremity subcutaneous nodules, and Raynaud's phenomenon. Her medications included omeprazole, sulfasalazine, methotrexate, hydroxychloroquine, prednisone, folic acid, tramadol, and levofloxacin. Family history was significant for maternal RA. On admission, the patient was tachycardic and physical examination revealed a thin, anxious woman. Neurologic, ophthalmic, cardiac, pulmonary, and abdominal examinations were unremarkable. Musculoskeletal exam was significant for symmetric MCP and PIP joint swelling and ulnar deviation. Dermatologic examination revealed a malar rash, left lower-extremity 2×2 and 1.5×1 cm ulcerations to subcutaneous tissue, multiple healed bilateral lower extremity ulcerations, and multiple bilateral extremity <1 cm subcutaneous nodules. No oral ulcers, sclerodactyly, telangiectasias, heliotrope rash, or Gottron's papules were noted. Labs revealed mild leukopenia without neutropenia, anemia of chronic disease, and elevated ESR. The initial differential diagnosis included rheumatoid vasculitis, infection, and pyoderma gangrenosum. Wound and tissue cultures confirmed pan-susceptible *Pseudomonas aeruginosa*. A punch biopsy was performed but results were not immediately available. The patient was continued on levofloxacin, sulfasalazine, hydroxychloroquine, and tramadol. After multiple days, granulation tissue began to form within the ulcers and the patient was discharged with close follow-up. Final biopsy review after discharge by a board-certified dermatopathologist revealed calcinosis cutis with multibacterial infection and lipodermatosclerosis.

DISCUSSION: Calcinosis cutis involves the deposition of calcium and phosphorus within the skin, causing a chronic inflammatory state that damages tissue and interferes with calcification inhibitors, facilitating mineralization. Additionally, the deposits may ulcerate, extrude calcium salts, or become secondarily infected. Classically seen 8–10 years after initial diagnosis in dermatomyositis and systemic sclerosis, calcinosis cutis may present in other autoimmune connective tissue diseases (ACTDs) and can be difficult to diagnose given its variable clinical latency (2–312 months). Although calcinosis cutis is a rare complication of SLE/RA overlap syndrome, it should be suspected in patients with subcutaneous nodules that present with chronic ulcers. The delay in the patient's diagnosis

highlights the importance of a thorough work-up for chronic, slow-healing ulcers in all patients, especially those with ACTDs. While bacterial superinfection may occur, poor response to antibiotics should alert the internist that further investigation with biopsy is indicated, as it provides excellent diagnostic and prognostic information. Furthermore, a tendency towards earlier biopsy may avoid unnecessarily subjecting patients to extended courses of antibiotics, particularly if suboptimal responses are documented. Clinical improvement of calcinosis cutis in ACTDs is dependent upon successful treatment of the three main contributing factors: 1) **Controlling the underlying inflammatory state**—appropriate use of DMARDs and biologic agents. 2) **Eradicating any infectious pathogen(s)**—judicious use of antibiotics tailored to bacterial sensitivities. 3) **Reducing calcific burden**—medically (diltiazem, minocycline, warfarin, aluminum hydroxide, etc.) vs. procedurally (surgical excision, extracorporeal shock wave lithotripsy, carbon dioxide laser). While small studies and anecdotal evidence support each of the aforementioned therapies, a recent dermatologic review concluded that surgical intervention was the first-line therapy for idiopathic calcinosis cutis and effective in SLE patients. Despite these encouraging results, reduction of calcific burden has primarily been studied in patients with either a single rheumatologic diagnosis or idiopathic calcinosis cutis. Thus, the effectiveness of the various treatments is unknown in overlap disorders and patient preference and side effect profiles should guide therapy. Additional literature and experience are needed to develop an appropriate treatment algorithm.

CLASSIC HYPERTENSIVE EMERGENCY? AN UNUSUAL CASE OF LABILE HYPERTENSION Kanapa Kornswad¹; Alfredo Camero². ¹University of Texas Health Science Center, San Antonio, TX; ²University of Texas Health Science Center at San Antonio, San Antonio, TX. (*Tracking ID #2168599*)

LEARNING OBJECTIVE #1: To recognize an atypical variant of Guillain Barre Syndrome

LEARNING OBJECTIVE #2: To identify the role of autonomic dysfunction in GBS.

CASE: A 65 year old man presented with 1 day of headaches and dizziness. He denied vision changes, chest pain, or weakness. His past medical history was significant for hypertension, chronic kidney disease stage III, and type 2 diabetes mellitus. His blood pressure was noted to be 216/122 with otherwise normal vital signs. His physical exam demonstrated no neurologic abnormalities and his optic disc showed no papilledema. His serum creatinine was 3.7 mg/dL with a baseline serum creatinine of 1.6 mg/dL. A computed tomographic (CT) scan of his head was normal. He was started on a nicardipine drip for aggressive blood pressure control. His blood pressure was labile and corrected quickly over 1 h to 140/80, and thus the drip was stopped. His blood pressure remained labile throughout the subsequent days requiring either extra anti-hypertensive medication or intravenous fluids for hypotension. On his third hospital day, he developed altered mental status with hypercapnea that required intubation for airway protection. It was noted that he could not move his extremities but did open and close his eyes on command. His physical exam at that time showed areflexia. A magnetic resonance image (MRI) of the brain showed a small acute lacunar infarct involving the left lateral thalamus, which did not explain his neurologic deficits. Lumbar puncture was performed due to a concern for GBS. Cerebrospinal fluid (CSF) studies showed a protein level of 144 mg/dL (elevated), no white blood cells, and a negative infectious workup for multiple viruses and bacteria. Electromyography (EMG) and nerve conduction studies were performed that showed evidence of primarily axonal sensory/motor peripheral polyneuropathy. An autoimmune workup was also performed, which was significant for a positive antibody to ganglioside GM1. His diagnostic studies were consistent with a diagnosis of acute motor and sensory axonal neuropathy (AMSAN). He was treated with IVIG therapy for 5 days with remarkable improvement over several weeks with eventual full motor strength recovery on all four of his extremities.

DISCUSSION: Dysautonomia is a common feature of GBS (reported as high as 70 % of cases). Typical cardiovascular findings of dysautonomia in GBS include tachycardia, persistent hypertension, labile blood pressure, and arrhythmias. Our patient exhibited signs of very labile blood pressure that was very sensitive to different medications. Although this was a clue to dysautonomia, he wasn't experiencing neurologic symptoms yet, and thus GBS, or AMSAN specifically, was not one of our differential diagnoses. AMSAN is a variant of GBS typically seen in non-US countries. This variant of GBS is typically differentiated via EMG and antibody tests anti-gangliosides and is associated with higher rates of respiratory failure. His recovery with IVIG is also unusual since cases of AMSAN typically do not have such quick recoveries. Our case highlights a very unusual clinical presentation to an atypical variant of GBS. Hypertensive crises that are overly sensitive to medication should raise the suspicion to a general internist of the possibility of dysautonomia playing a pathophysiological role and thereby adjusting their differential diagnoses accordingly.

CLINICAL ETHICAL DILEMMAS AND THE PRINCIPLE OF PRIMUM NON NOCERE Sagger Mawri²; Jainil Shah²; Joseph Gibbs²; Jessie Tan²; Heidi Alvey¹; Najia Huda². ¹Henry Ford Health System, Southgate, MI; ²Henry Ford Hospital, Detroit, MI. (Tracking ID #2199035)

LEARNING OBJECTIVE #1: Describe a clinical case that illustrates an ethical dilemma and explore different approaches that may be used to facilitate the clinical decision making process

LEARNING OBJECTIVE #2: Explore the risks and potential unintended harms of routine medical interventions and revisit the principle of “First, Do No Harm” (Primum Non Nocere) to ensure safe and ethical patient care

CASE: A 60 year-old man with history of hypertension and diabetes mellitus type 2 was admitted to the hospital for progressive proximal muscle weakness. He was undergoing neurological work-up for suspected amyotrophic lateral sclerosis (ALS). In the general medical floor, he was noted to have gradual increased work of breathing and arrangements were made to transfer him to the medical intensive care unit to receive bilevel positive airway pressure (BPAP). However, his transfer was delayed for several hours due to shortage of ICU beds. Upon arrival to the ICU, he was started on non-invasive ventilation, but did not tolerate it well. Due to impending acute respiratory failure, he was intubated and mechanically ventilated. Following intubation, he developed aspiration pneumonia and was started on Vancomycin and Piperacillin/Tazobactam. Unfortunately, he developed antibiotic-induced acute interstitial nephropathy. He was switched to Moxifloxacin, but subsequently acquired clostridium difficile colitis. His ventilator settings escalated and neurology team determined that his ALS was rapidly progressive. He was fully informed of his prognosis and slim chances of being weaned successfully off the ventilator. His renal failure progressed rapidly and he became oliguric, volume overloaded and developed electrolyte derangements. Urgent hemodialysis was needed; however, at this point the patient refused any further medical interventions. After 3 weeks on the ventilator and subsequent tracheostomy placement with continued clinical decline, the patient finally expressed that life had become too burdensome to bear living. In writing, he thanked the physicians for their efforts to help him and decided to spend his final moments with his younger siblings. Per his wishes, he was weaned off the ventilator and, shortly thereafter, he passed away.

DISCUSSION: In an era of great medical advancements, today's physician is armed and trained with a powerful arsenal of diagnostic and therapeutic tools used to combat diseases and thereby heal patients. However, modern medicine's emphasis on intervention creates a risk for causing inadvertent harm to the patient, as a consequence of medical actions. The above case highlights this point. Each medical intervention used to treat and benefit the patient resulted in an unintended harm to him. Moreover, the case illustrates an example of the tension between a patient's autonomy and medical paternalism, and the difficult medical decision making that arises with this ethical conundrum. The patient was determined to have a rapidly progressive form of ALS. He chose life support and underwent tracheostomy tube placement, despite worsening respiratory status that did not appear to have good chances of improvement, and which may have only prolonged his suffering. Therefore, a greater degree of medical paternalism may have been used to establish a balance with the patient's autonomy. Perhaps it should have been discussed with the patient that a limited trial on the ventilator be attempted, after which the focus should be on comfort care only. Furthermore, in accordance with guidelines from the society of critical care medicine (SCCM) and agency for healthcare research and quality (AHRQ), early multidisciplinary conversations at 72–96 h of ICU stay may have been arranged to help facilitate the decision-making process, and limit the burden of advanced supportive technology when it was deemed ineffective. In addition, adopting an ethical-reasoning tool may have allowed for a structured framework to guide formulation of an informed, morally justified decision. An example is applying the Jonsen's “four boxes” approach, which consists of four broad topics —medical indications, patient preferences, quality of life, and contextual features—within which lie more specific questions to be considered in working through the case. This case serves as a reminder that any medical intervention we perform carries with it the potential risk for unintended harm. It echoes the importance of the most humanistic and enduring pillar of our medical profession: “First, Do No Harm.” The case also illustrates the ethical dilemmas that physicians often confront when making clinical decisions, and the importance of reflecting upon and appraising our management decisions to ensure the delivery of safe and ethical patient care.

CNS LYME WITH CRANIAL NERVE VI Palsy AND CHARLES BONNET SYNDROME Paul X. Fu²; Lorenzo Falchi²; Vincent Lau²; Hajime Tokuno²; Anne Hyson^{1, 2}. ¹West Haven VA, Cos Cob, CT; ²Yale School Of Medicine, New Haven, CT. (Tracking ID #2193722)

LEARNING OBJECTIVE #1: Diagnose CNS Lyme in the setting of isolated cranial nerve VI palsy and visual hallucinations

LEARNING OBJECTIVE #2: Recognize association of CNS Lyme Disease with Charles Bonnet Syndrome

CASE: An 87 year old male with no significant past medical history presented with gradually worsening horizontal diplopia for 1 week. He denied other systemic or neurological symptoms but does report spending much of his time in the woods, often removing ticks from his skin in the past 2 months. On physical exam, patient was found to have left cranial nerve VI palsy. The remaining neurological exam was unremarkable. Notably, patient has noticed visual images that occur unilaterally in his left eye when he closes that eye. These images are fully formed and stimulating, including scenes from the Battle of Little Big Horn, or children playing. He was aware that these images were not real, and they only appeared in the left eye. Initial workup for diplopia included testing for myasthenia gravis, MRI brain, and Lyme disease studies. MRI brain showed no acute intracranial process. Tensilon test and antibodies for myasthenia gravis were negative, however, screening for Lyme was positive. Serum testing by Western blot demonstrated positive Lyme IgM, and negative IgG. Lumbar puncture was obtained with CSF analysis showing protein of 163 mg/dL, glucose of 61 mmol/L, and nucleated cells of 153 per mm³, with 96 % lymphocytic predominance. CSF Lyme index was positive for IgM (>1:16) and negative for IgG (<1:4). A diagnosis of early disseminated Lyme disease was made, and planned treatment was ceftriaxone IV 2 g daily for 21 days. After 14 days of antibiotics, patient continued to notice visual images whenever he closed his left eye. These images were again fully formed scenes, and only occurred in his left eye when closed, or when he wore an eye patch over the effected eye. Lumbar puncture and MRI were repeated at this time. CSF studies showed improvement in the CSF with protein of 94.7 mg/dL, glucose of 60 mmol/L, and nucleated cells of 32 per mm³ with 96 % lymphocytic predominance. Repeat MRI showed bilateral cranial nerve enhancement of nerves III, VI, and VII consistent with persistent CSF Lyme disease. Decision was made to treat patient with IV ceftriaxone for extended 28 days. Patient's final diagnosis was early disseminated Lyme disease associated with Charles Bonnet Syndrome of the left eye.

DISCUSSION: In the United States, Lyme disease is caused by the bacteria *Borrelia burgdorferi*, which is transmitted via the vector *Ixodes* tick. Presentation of Lyme disease can be generally distinguished into three categories: early (1–2 weeks after transmission), disseminated (1–2 months), and late (months to years). Erythema migrans is the classic presenting sign of early Lyme disease, and is found in 80 % of patients in combination with constitutional symptoms. Disseminated disease occurs weeks to months after initial transmission and include neurological and cardiac manifestations. Lyme disease affects the CNS in 10–15 % of cases. Signs of CNS spread of Lyme disease include lymphocytic meningitis, cranial nerve involvement (commonly facial nerve) and painful radiculopathy. Isolated cranial nerve VI palsy as the presenting sign of Lyme disease has been rarely described. Charles Bonnet Syndrome is defined by the appearance of complex visual hallucinations in a patient with impaired eyesight. A diagnosis of Charles Bonnet Syndrome requires that the patient recognizes these images are not real, in addition to the absence of an underlying psychiatric illness. To the best of our knowledge, this is the first report of early disseminated Lyme disease causing cranial nerve VI palsy and Charles Bonnet Syndrome.

COGNITIVE DYSFUNCTION CAUSE BY HYPOGLYCEMIC ENCEPHALOPATHY Taihei Ishikawa; Naoki Matsuura; SATOSHI MATSUNAGA; Hiroyuki Oda; Takashi Akaiwa; Hiroshi Imura; Mitsuo Kozuru. Aso Iizuka Hospital, Iizuka, Japan. (Tracking ID #2197226)

LEARNING OBJECTIVE #1: Include hypoglycemic encephalopathy in the differential diagnosis of any individual with cognitive dysfunctions following a comatose status.

LEARNING OBJECTIVE #2: Recognize the importance of a cerebral MRI at an early stage to diagnose hypoglycemic encephalopathy.

CASE: A 52 year-old Japanese man with no a history of diabetes or cognitive impairment was transferred to our hospital in a comatose status. The patient had excessive alcohol consumption the previous night and his wife found him unconscious in the morning of admission. His initial Glasgow Coma Scale (GCS) score was 6 (eye opening: 1; verbal: 1; motor: 4), and his blood glucose level was 1.6 mmol/L. After an intravenous bolus shot of 50 % glucose by a paramedic, he was transferred to our emergency department. On arrival at our hospital, his GCS score was elevated to 9 (eye opening: 4; verbal: 1; motor: 4). Otherwise he had no significant neurological signs. His arterial blood gas revealed metabolic acidosis with a lactate level of 2.8 mmol/L. A urine test showed positive ketone body. Although his level of consciousness gradually recovered after fluid replacement with thiamine, he still had cognitive dysfunctions. A cerebral MRI was performed on Day 2, which revealed several high intensity lesions in the bilateral hippocampi and the splenium of the corpus callosum. These lesions disappeared on Day 16. His Mini-Mental State Examination score gradually improved to 9 (out of 30) on Day 7, 11 on Day 16, and 15 on Day 25. Based on his history of prolonged hypoglycemic state and the

MRI findings, we made a diagnosis of hypoglycemic encephalopathy as the cause of his cognitive dysfunctions. He was transferred to a local clinic for further rehabilitation on Day 25.

DISCUSSION: Hypoglycemic encephalopathy is a metabolic brain disorder caused by critically low levels of blood glucose. Common causes are 1) overdose of insulin or an oral agent for diabetes mellitus, 2) insulin-secreting tumor, and 3) depletion of liver glycogen storage due to prolonged starvation, alcohol consumption, or liver failure. Prolonged and severe hypoglycemia can cause irreversible brain damage in some vulnerable brain regions, such as in the cerebral cortex and the hippocampus. Neuronal death in the hippocampus results in permanent cognitive impairment. A number of cases report that diffusion weighted imaging often shows hyperintense lesions in the hippocampi and the cerebral cortex, which might either remain or disappear over time. In our case, we considered that the cause of his cognitive dysfunctions was due to hypoglycemic encephalopathy since his history strongly suggested that he had a prolonged hypoglycemic state prior to admission. His MRI findings were also compatible with this diagnosis. Based on his MRI and EEG findings, other causes of cognitive dysfunctions, such as hypoxemia, Wernicke's encephalopathy, and epilepsy are less likely. In conclusion, hypoglycemic encephalopathy should be in the differential diagnosis of any individual with cognitive dysfunctions following a comatose status, and a cerebral MRI should be performed for accurate diagnosis.

COMPLICATION OF INFERIOR MYOCARDIAL INFARCTION; WHEN PHYSICAL EXAMINATION BECOMES UNRELIABLE Naoki Misumida¹; Akihiro Kobayashi. Beth Israel Medical Center, New York, NY. (Tracking ID #2196330)

LEARNING OBJECTIVE #1: Recognize the importance of thorough workup for a mechanical complication following myocardial infarction, even when a cardiac murmur is not present.

LEARNING OBJECTIVE #2: Review the typical clinical course of the complication following inferior myocardial infarction

CASE: A 74-year-old woman with morbid obesity presented with chest pain lasting for 3 h. Chest pain was constant, pressure sensation, located in her left chest. Blood pressure was 106/91 mmHg, pulse rate was 71 /min, respiratory rate was 28 /min, and oxygen saturation was 78 % on 15 L of oxygen through non-rebreather mask. Body mass index was 45 kg/m². Physical examination showed bilateral crackles without cardiac murmur. EKG revealed sinus rhythm and ST-segment elevation in inferior leads without Q-wave. Chest X-ray revealed bilateral pulmonary vascular congestion. Patient was in respiratory distress and subsequently intubated. Patient was diagnosed with inferior ST-segment elevation myocardial infarction and taken to an emergent cardiac catheterization, which showed a total occlusion of right coronary artery. Patient successfully underwent percutaneous coronary intervention. Initial troponin I value was 2.4 µg/ml and troponin was further elevated to 208 µg/ml. Patient became hypotensive and required high-dose catecholamine and intra-aortic balloon pump support. Transthoracic echocardiography showed preserved ejection fraction with regional wall motion abnormality in inferior wall, but an evaluation of mitral valve was limited due to morbid obesity. No cardiac murmur was appreciated on serial physical examinations. Patient remained hypotensive and heart failure was not controlled. On day 3, trans-esophageal echocardiography was performed, which revealed papillary muscle rupture and severe mitral regurgitation. Her condition failed to improve despite intensive medical treatment, and she underwent mitral valve replacement on day 5. After a prolonged duration of hospital stay, the patient was discharged to sub-acute rehabilitation facility.

DISCUSSION: The present case highlighted the importance of thorough workup for a mechanical complication following myocardial infarction and the limitation of physical examination. Acute mitral regurgitation caused by papillary muscle rupture is a rare life-threatening complication of myocardial infarction. Papillary muscle rupture usually occurs in patients with an inferior infarction 2 to 7 days after the infarction, as in the present case. The initial clue to recognize this rare complication is usually physical examination findings since severe mitral regurgitation usually causes easily appreciable loud cardiac murmur. The present case was, however, atypical in terms of the physical exam findings. Mechanical noise due to intra-aortic balloon pump and patient body habitus made it impossible to detect cardiac murmur, and only trans-esophageal echocardiography was able to reveal severe mitral regurgitation. Our study suggested that mechanical complication should be investigated when a patient with inferior myocardial infarction develops persistent hypotension and heart failure, even when a cardiac murmur is not present. Urgent surgical intervention is the treatment of choice of this complication, as the mortality rate of medically managed patient is high. Papillary muscle rupture can happen after a patient is transferred to general medicine floor, and therefore recognizing this rare complication is important for internists to provide appropriate care to patients with recent myocardial infarction.

COMPRESSION, CLOT FORMATION, AND CHRONIC PAIN: A CASE OF MAY-THURNER SYNDROME Christopher Lin-Brand¹; Anna Platovsky². ¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2198405)

LEARNING OBJECTIVE #1: Recognize and diagnose anatomic variants that cause deep vein thrombosis (DVT)

LEARNING OBJECTIVE #2: Manage DVTs caused by venous compression syndromes

CASE: A 69 year-old woman presented with progressive left lower extremity (LLE) pain and swelling with difficulty ambulating for 2 weeks. The symptoms developed 1 day after a period of prolonged sitting. Duplex ultrasound revealed extensive deep vein thrombosis (DVT) of the entire LLE venous system. The patient was started on warfarin 5 mg daily and discharged home after bridging. One week later, she returned with worsening symptoms of pain and swelling, most notably in the left posterior knee and calf. The LLE had diffuse non-pitting edema, warmth, erythema, and tenderness to palpation from the toes to the upper thigh. She had difficulty bearing weight and could not walk, but she had palpable dorsalis pedis pulses, intact sensation, and full strength bilaterally with no evidence of skin breakdown. Serum studies were significant for an INR of 4.2. Despite the supratherapeutic INR, repeat ultrasound revealed a common femoral DVT extending into the left external and common iliac veins. The patient denied any predisposing factors for hypercoagulability such as known malignancy, estrogen supplements, or personal or family history of thromboembolism. Due to the extent of the clot and her significant symptoms, interventional radiology was consulted for catheter-directed thrombolysis. Venography incidentally revealed filling defects consistent with May-Thurner syndrome. As a result, tissue plasminogen activator (tPA) was administered to dissolve the thrombus and a left common iliac vein stent was placed to maintain patency of the vessel.

DISCUSSION: May-Thurner Syndrome (MTS) is a vascular anomaly caused by compression of the left common iliac vein (LCIV) between the right common iliac artery and lumbar vertebrae. This anomaly can lead to venous spur formation, obstruction, and extensive DVT. MTS is found in 2–5 % of lower extremity venous disorders, but given rates of LCIV compression of 20–30 % in some autopsy studies, the prevalence of MTS is likely underestimated. The syndrome typically presents as an extensive left-sided DVT in young women ages 20–40, which can lead to serious consequences such as pulmonary embolism (PE), death, and post-thrombotic syndrome (PTS). The leg symptoms and skin changes of PTS are found in about 20–50 % of patients post-DVT and are a significant source of morbidity. Patients with MTS may be asymptomatic until they present with acute DVT (often left-sided and proximal), chronic PTS changes (persistent pain, swelling, paresthesias, pruritus, skin pigmentation, recurrent ulcers), or PE. Imaging confirms the clinical findings, but duplex ultrasound (US) typically used in DVT diagnosis cannot visualize the compressed LCIV in the pelvis, especially if the patient is obese. X-ray, CT, and MR venography are invasive and expensive procedures; however, they are the gold standard for diagnosis and endovascular treatment of MTS and should be performed if there is strong suspicion of venous compression, especially if initial US reveals an extensive proximal thrombus. Intravenous ultrasound (IVUS) is often a useful adjunct for direct visualization of the vessel. Alternatively, non-invasive imaging with CT and MRI of the pelvis may provide evidence of compression without the need for a procedure initially. Standard therapy for DVT, including cases of MTS, consists of systemic anticoagulation with low molecular weight heparin (LMWH) and warfarin. Further treatment of MTS centers on two major goals: reducing the severity of PTS and preventing compression of the vein. Endovascular interventions such as catheter-directed thrombolysis (CDT) and mechanical thrombectomy have increasingly supplanted surgical procedures to enhance long-term iliofemoral patency and decrease morbidity from PTS. The regular daytime use of elastic compression stockings for 2 years after DVT further decreases the incidence of PTS by 50 %. Additionally in MTS, stents are essential for maintaining patency of the vessel and have been shown to reduce rates of rethrombosis. Early recognition of MTS with appropriate imaging and treatment is critical to prevent morbidity and mortality, especially since standard therapy alone will almost invariably result in PTS. Typical cases involve young women with extensive left-sided proximal DVT, but clinicians must be aware that non-compressive and compressive forms of DVT are often indistinguishable and that the latter are likely underdiagnosed. Patient demographics and presentation as well as invasiveness and cost of the procedure are all important factors in selecting the imaging modality. Further research must be done to determine whether non-invasive CT and MRI have utility over venography when MTS is suspected. Once the diagnosis is made, however, anticoagulation, thrombolysis, and stenting must all be used in concert to prevent the long-term sequelae of MTS.

CONFUSION THE MIDST OF LUPUS Rebecca E. Virata¹; Yelena Averbukh². ¹Albert Einstein College of Medicine, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2155934)

LEARNING OBJECTIVE #1: Recognize delirium as a presentation of neuropsychiatric lupus in the absence of systemic disease.

LEARNING OBJECTIVE #2: Understand the complexities of the diagnostic work-up of neuropsychiatric lupus.

CASE: A 24-year-old female with systemic lupus erythematosus (SLE) and a recent hospitalization for SLE flare which was treated with steroids, presents with increasing social withdrawal, decrease oral intake, and headaches for 1 month since last admission. On physical exam, patient had no rashes or arthropathy. Patient was found to have flat affect and poverty of speech with no sensory or motor defects noted on neurologic evaluation. Laboratory studies revealed the patient had normal complement (C3 120, C4 22) and non-elevated anti-dsDNA (47.2) which were not consistent with a lupus flare. MRI of the brain did not show microhemorrhagic findings that could be consistent with SLE cerebritis. She was started on antipsychotic medications with no clinical improvement. Given lack of response, the patient was started on steroid therapy with rapid improvement of her psychiatric symptoms including increased appetite and ability to engage in social interactions. After 3 days of high dose pulse steroid therapy, the patient was discharged on prednisone and antipsychotic medication with close follow-up with rheumatology and psychiatry services.

DISCUSSION: SLE is an autoimmune disease caused by inflammatory cytokines, autoantibodies, and immune complexes causing systemic inflammation and organ damage. Neuropsychiatric lupus (NPSLE) is thought to affect anywhere between 15 and 80 % of adults with SLE. Clinical manifestations vary from headache, anxiety, depression, and cognitive dysfunction to psychosis and seizures with a total of 19 specific neuropsychiatric syndromes being defined by the American College of Rheumatology. Interestingly, these syndromes can develop outside of active systemic disease and serologic activity and even precede other systemic manifestations. While the pathophysiology is not fully elucidated in NPSLE, it is thought that the inflammatory process involved in the cytokine, autoantibody, and immune complex damage in other organs also affect neurons and the vessels supplying them. SLE also disrupts the blood-brain barrier resulting in the entry of autoantibodies and other molecules that lead to neuronal damage. Some of these autoantibodies may aid the diagnosis, however, none are highly specific or sensitive. Imaging may also assist in the diagnosis. While MRI's may find focal abnormalities, such as cortical atrophy, ventricular dilation and infarcts, functional MR and SPECT can also sense perfusion or metabolic changes in NPSLE in patients with an otherwise normal MRI. Mainstay treatments of NPSLE are glucocorticoids, aspirin, and hydroxychloroquine as well as other immunomodulators. However, treatment must also be tailored to the disease, whether its addressing the presence of antiphospholipid antibodies that increase the risk of stroke or using psychiatric medicines to symptomatically treat mood disorders. In severe NPSLE, more aggressive immunosuppressive agents such as cyclophosphamide have been found effective. Intravenous immunoglobulins, rituximab, plasmapheresis, azathioprine and methotrexate have been used with some success in steroid unresponsive cases. As in the case of our patient with known SLE presenting with psychiatric symptoms, it is important to have a high degree of clinical suspicions for NPSLE, especially given a high prevalence of that syndrome in SLE patient populations. Given both primary psychiatric conditions and NPSLE are diagnoses of exclusion, the right diagnosis for SLE patients with neuropsychiatric findings is challenging. This case has shown that patients who fail to respond to antipsychotic medications, delirium in SLE patients can be treated with immunosuppressive therapy.

CONSEQUENCES OF INCIDENTAL RADIOGRAPHIC FINDINGS. Linh T. Nguyen; Chris Sullivan; Anil N. Makam. UT Southwestern, Dallas, TX. (Tracking ID #2195040)

LEARNING OBJECTIVE #1: Recognize that investigation of incidental radiographic findings can lead to unnecessary hospitalization and iatrogenic injury.

LEARNING OBJECTIVE #2: Engage patients in shared decision making earlier in the course before an extensive work up is conducted or plan of care is developed.

CASE: Mrs. C is a frail 76 year old woman from Mexico with stage IV COPD and history of tuberculosis (TB). One year ago an asymptomatic right carotid body tumor was incidentally discovered during CT angiography to evaluate a possible stroke. Her biochemical workup was nonrevealing, consistent with a benign nonsecretory paraganglioma of her neck. The 1-year surveillance CT scan of her neck showed no significant increase in tumor size, but did show new right upper lobe lung nodules. Mrs. C was admitted to the hospital for workup of this incidental finding. Aside from a cough slightly worsened from baseline, Mrs. C was in her normal state of health. Testing for infectious and neoplastic etiologies were negative, except for 1

of 3 sputum cultures growing an acid-fast bacilli (AFB) without growth from a bronchoalveolar lavage. Mrs. C was discharged with anti-TB therapy while awaiting final identification of the organism. Three days later, she returned to the emergency department with vomiting and abdominal pain. Her transaminases were elevated and she was re-hospitalized for drug induced liver injury. Her anti-TB therapy was discontinued and she subsequently recovered after 8 more days in the hospital. The single sputum culture that initially grew an AFB was ultimately negative for TB. A later conversation with the patient revealed that given lack of symptoms, older age, frailty, and severe COPD, she would have declined any surgery to excise the carotid body tumor were it offered.

DISCUSSION: Surgical excision for benign nonsecretory paragangliomas of the neck presents a significant risk of cranial nerve injury or stroke (35 %) or death (1 %) [1]. In this elderly, frail patient with severe COPD, surgery would have presented a greater than usual risk of adverse outcome. Given Mrs. C's lack of symptoms and aversion to surgery, annual surveillance CT was unnecessary, as it would not have changed management even if the tumor had increased in size. Incidental findings on a CT scan in an asymptomatic patient can be non-specific and often lead to unnecessary clinical work up. In a retrospective cohort study of 1426 imaging studies, 40 % of imaging examinations had at least 1 incidental finding, the incidence of which increased with age [2]. The majority of incidental findings that were investigated further did not result in a clear benefit to the patient. A meta-analysis evaluating incidental findings discovered during cardiac CT showed a similar rate of incidental abnormalities (44 %) and of these only 0.7 % were subsequently found to be malignancies [3]. This case illustrates how further investigation of incidental radiographic findings, especially without engaging the patient in shared decision making to elicit the patient's wishes for care, can result in unnecessary hospitalizations and iatrogenic injury to patients. Ideally, a more careful discussion about the patient's general prognosis due to severe COPD and advanced age, as well as her desire to forgo any invasive surgery, should have been held before an extensive workup for asymptomatic incidental findings was conducted. 1. Sajid MS, Hamilton G, Baker DM, Joint Vascular Research Group. "A multicenter review of carotid body tumour management." *Eur J Vasc Endovasc Surg.* 2007 Aug; 34(2):127-30 2. Orme NM, Fletcher JG, Siddiki HA, Harmsen WS, O'Byrne MM, Port JD, Tremaine WJ, Pitot HC, McFarland EG, Robinson ME, Koenig BA, King BF, Wolf SM. "Incidental findings in imaging research: evaluating incidence, benefit, and burden." *Arch Intern Med.* 2010 Sep 27;170(17):1525-32 3. Flor N, Di Leo G, Squarza SA, Tresoldi S, Rulli E, Cornalba G, Sardanelli F. "Malignant incidental extracardiac findings on cardiac CT: systematic review and meta-analysis." *AJR Am J Roentgenol.* 2013 Sep;201(3):555-64

COOMBS NEGATIVE EVANS SYNDROME Apama Basu; Dhruvan Patel; Rajiv Bhattarai. Mercy Catholic Medical Center, Philadelphia, PA. (Tracking ID #2200332)

LEARNING OBJECTIVE #1: A negative Coombs test does not exclude the diagnosis of Evans syndrome

CASE: A 26 year old Caucasian female presented to the hospital with petechial rash on her extremities for 7 days. She had no complaints of bleeding. Her exam was only notable for petechiae on her arms and legs. There was no pallor, lymphadenopathy or organomegaly. Initials labs included a platelet count of 4000 cells/mm³ and hemoglobin of 11.9 gm/dL. During hospitalization her hemoglobin fell to 9.8 gm/dL without signs of bleeding. Further labs included reticulocyte count of 5.9 %, haptoglobin <10 U/L, and LDH 519 U/L. A review of the peripheral smear revealed no schistocytes. Her ANA, APLA, hepatitis panel, HIV, Direct (IgG) and Indirect (IgM) Coombs test were negative. A diagnosis of coombs negative Evans syndrome was made. She was treated with high dose prednisone and IV Immunoglobulins with improvement of hemoglobin (to 15 gm/dL) but not platelet count. Steroids were discontinued and rituximab was initiated with resolution of thrombocytopenia.

DISCUSSION: Evans syndrome is a chronic, relapsing condition with autoimmune hemolytic anemia and thrombocytopenia that does not have a clear etiology. The pathogenesis of autoimmune hemolytic anemia is believed to be due to IgG antibodies that react with protein antigens on the red blood cell surface at body temperature leading to hemolysis. The pathogenesis of thrombocytopenia is similar but with different antibodies binding to platelets. Direct Coombs test is used to detect presence of antibodies bound on red blood cell surface antigen. In Evans syndrome, the direct Coombs test is usually positive. But as highlighted in our case a negative Coombs test does not exclude the diagnosis of Evans Syndrome. The Coombs test can false negative sometimes because of low levels of IgG that falls below the detection threshold. In such cases a diagnosis of Coombs negative Evans syndrome can be if a patient is found to have autoimmune hemolytic anemia and thrombocytopenia without any other diagnosis explaining the findings. Treatment options include corticosteroids, IVIG, rituximab, splenectomy with

varying results. Existing data shows promising results with Rituximab. Further studies are needed on this subject to compare with other treatment modalities.

COPYCAT PANCREATITIS: A CASE OF AUTOIMMUNE PANCREATITIS AND THE IMPORTANCE OF EARLY DIAGNOSIS Adil S. Zahiruddin¹; Andrew Caruso^{2,1}. ¹Baylor College of Medicine, Houston, TX; ²Michael E. DeBakey VA Medical Center, Houston, TX. (Tracking ID #2199996)

LEARNING OBJECTIVE #1: Autoimmune pancreatitis (AIP) is an IgG4 associated disease (systemic fibroinflammatory disorder) that has pancreatic and extrapancreatic manifestations. The similarity in clinical presentation to pancreatic cancer makes for a significant diagnostic challenge and significantly alters therapy.

CASE: A 67 year old African American male presented with two weeks of painless jaundice, darkening urine, and light-colored stools. Patient denied abdominal pain, fevers, chills, night sweats, or significant weight loss. Laboratory studies revealed a total bilirubin of 12.6 mg/dl, elevated alkaline phosphatase (435 IU/L), normal serum transaminases, elevated IgG levels (2990 mg/dl). Abdominal CT revealed a soft tissue mass in the proximal common bile duct causing intrahepatic biliary ductal dilatation concerning for cholangiocarcinoma. The pancreas was not diffusely enlarged. ERCP revealed diffusely dilated intrahepatic bile ducts without beading, a tight stricture within the distal common hepatic duct, and midcommon bile duct approximately 1 cm in length. Biliary sphincterotomy was performed with common bile duct biopsies and a plastic biliary stent placed with prompt drainage of bile and contrast. An EUS revealed heterogeneous and edematous pancreatic head parenchyma with no discrete mass. There was heterogeneous and hypoechoic circumferential thickening of the mid and distal common bile duct. Several core needle biopsies of the pancreatic head revealed a dense lymphoblastic infiltrate organized in a storiform pattern with obliterative phlebitis and negative for malignant cells. Prednisone therapy was initiated (40 mg/day for six weeks with a subsequent slow taper). At discharge, the total bilirubin decreased to 3.6 mg/dl with improvement in symptoms. Biliary stent is to be exchanged in 4 months with repeat CT abdomen with pancreatic protocol at that time. Serum IgG4 subclass antibodies were not elevated.

DISCUSSION: AIP was first recognized as a distinct form of chronic pancreatitis in 1995. Obstructive jaundice is the most common presenting symptoms. For physicians, it is crucial to recognize this disease as the presentation is very similar to that of malignancy. In contrast to malignancy, AIP responds dramatically to steroids. Studies have shown that about one third of patients undergoing pancreatic resection for possible cancer were ultimately found to have benign disease with the characteristic lymphoplasmacytic infiltrate of AIP. Furthermore, about 30 % of patients with autoimmune pancreatitis relapse. Recognition of autoimmune pancreatitis is crucial in both prognosis and defining therapeutic options.

COUGH COUGH: AN CASE OF MDR TB IN CT Bashir A. Geer; Nandini Nair. Yale New Haven Hospital, New Haven, CT. (Tracking ID #2197695)

LEARNING OBJECTIVE #1: To understand the presentation of primary and recurrent Tuberculosis and to understand how to differentiate TB vs. MDR TB vs. XDR TB and the treatment challenges involved with each.

CASE: This is a 33 yo Filipino woman w/ no significant PMH except a prior+PPD in the Philippines in '99 s/p INH, rifampin and Ethionamide who presented w/ F/C, SOB and DOE after doing a marathon in Kentucky and enjoying some cave exploration. She was found to have bibasilar infiltrates w/ a cavitary mass and positive sputum for TB. She was empirically started on INH PZA EMB AMIK Cyclo Avelox but later found to be resistant to all first line drugs and eventually discharged on a regimen of PAS, Cycloserine, Ethionamide, Linezolid, Avelox and Amikacin after 3 months. Her sputum sample was sent to the CDC and National Jewish where she was further found to be resistant to Avelox and Ethionamide. In collaboration with the CDC she was eventually started on Bedaquiline as she was taken off the Amikacin after 6 months of therapy because of hearing loss and at this time is doing well as an outpatient w/ clearance of her sputum. She is doing well and will continue on a treatment regimen for 2 years from original sputum clearance.

DISCUSSION: Per the WHO in 2012, 8.6 million people fell ill with TB and 1.3 million died from TB. In 2013 Connecticut reported 62 cases of TB and only one patient who had MDR TB because of her resistance to first line agents rifampin and INH as well as ethambutol, pyrazinamide, isoniazid, and rifampin, plus any fluoroquinolone and at least one of three injectable second-line drugs (i.e., amikacin, kanamycin, or capreomycin). MDR is a growing problem in the developing world with 450,000 cases reported in 2012 w/ 9.6 % having XDR TB. The risk of MDR TB is rapidly increasing as

in 2011 there were only 310,000 cases of MDR TB reported and this will present new challenges for future management of TB as more antibiotics become ineffective. Newer medications are being developed such as Bedaquiline to combat this growing threat of MDR TB with more in the pipeline as well. However as MDR and XDR TB become more prevalent here in the United States, we will need more effective regimens and protocols to deal with them.

COUGHING UP BLOOD Matthew L. Law. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198372)

LEARNING OBJECTIVE #1: Recognize the clinical criteria and "classic triad" for diagnosing a diffuse alveolar hemorrhage

LEARNING OBJECTIVE #2: Describe the need for early diagnosis and treatment of diffuse alveolar hemorrhage

CASE: A 50 year-old man presented with 2 months of progressively worsening shortness of breath along with a productive cough of dark red sputum, which had been occurring for the past two weeks. During the initial interview, he coughed up approximately 30 mls of bloody sputum. In the past 2 months, he had lost 30 lbs. His past medical history was significant for recurrent bouts of anemia, biopsy-proven membranous nephropathy and factor XII deficiency. On physical exam, a 2/6 systolic ejection murmur was noted along with skin examination showing a purplish rash on the face that spared the nasolabial folds. Hemoglobin was 5.1 g/dL with a baseline level around 9 g/dL. Platelet count was 467,000/mcL, and a prolonged PPT of 61 sec was noted with normal INR. ANA was 1:640 with a homogenous pattern; anti-Smith and anti-DS DNA antibody were negative. Bilateral patchy infiltrates were seen on chest x-ray with subsequent CT scan showing diffuse ground glass opacities. A diagnostic bronchoalveolar lavage was performed the following day confirming the diagnosis of diffuse alveolar hemorrhage. He was also diagnosed with systemic lupus erythematosus, which caused diffuse alveolar hemorrhage. He initially improved with high-dose steroids and cyclophosphamide. However, eventually his condition worsened with maximum medical therapy requiring mechanical ventilation, and shortly thereafter he died.

DISCUSSION: Shortness of breath along with new-onset hemoptysis is a common presentation that is encountered by internists. A very large differential exists for shortness of breath with broad categories including cardiac, respiratory and hematologic causes. In addition, new onset hemoptysis has a large differential, which includes bronchiectasis, TB, tumor, lung abscess, emboli and mitral stenosis. Diffuse alveolar hemorrhage is one of the most devastating complications of lupus with an estimated prevalence of approximately 5.4 % with reported mortality as high as 50 %. The "classical triad" of diffuse alveolar hemorrhage consists of hemoptysis, abrupt fall in hemoglobin level, and new onset pulmonary infiltrates. This patient presented with all the classical findings of diffuse alveolar hemorrhage. In evaluating any patient with suspected diffuse alveolar hemorrhage an infection must be ruled out. It is imperative to attempt to perform an early bronchoscopy with BAL to confirm the findings. The return of lavaged fluid should become progressively bloody from aliquot to aliquot to confirm the diagnosis of diffuse alveolar hemorrhage. Additionally, a BAL will allow the clinician to rule-out concomitant infections causing diffuse alveolar hemorrhage. The treatment for diffuse alveolar hemorrhage revolves around treating the autoimmune destruction of the alveolar capillary membrane. In patients with diffuse alveolar hemorrhage due to lupus, corticosteroids with the concomitant use of cyclophosphamide have been linked to better survival. A triad of hemoptysis, abrupt fall in hemoglobin and new pulmonary infiltrates should raise a high suspicion for diffuse alveolar hemorrhage. Due to the high mortality of the disease and need for immediate treatment with immunosuppression, a diagnostic BAL should be immediately performed to confirm the diagnosis and rule-out infections as another possible cause.

COUNTLESS CAUSES OF CONFUSION Jillian Edmunds; Raquel Belforti; William House. Baystate Medical Center, Springfield, MA. (Tracking ID #2196494)

LEARNING OBJECTIVE #1: Identify seizure as an important differential in altered mental status even in the elderly

LEARNING OBJECTIVE #2: List the limitations in the diagnosis for seizure

CASE: The patient is a 70-year-old female with a past medical history of hypertension and hyperlipidemia presenting to the emergency department with acute change in mental status. The husband of this patient states that on the day of admission she seemed off, unaware of the current year and asking nonsensical questions. She was noted to have slurred speech but denies focal weakness or paresthesias. In the days prior she admits to increased stress and fatigue but denies other complaints. She had a similar episode of confusion 2 months prior, which resolved spontaneously and a diagnostic work up in the emergency department did not reveal a cause. At baseline she has no neurological deficits and volunteers at

the hospital. Physical exam revealed a temperature of 100.2 F with other vital signs stable. Exam was unremarkable with no new focal deficits. Mental status was at her baseline, alert and oriented and speech was fluent and clear. Laboratory work-up showed WBC 11.6, creatinine 1.4, potassium 5.8, bicarbonate 20, AST 40, Lipase 83. Free T₄, lactate, ammonia, and RPR were within normal limits. A head CT and brain MRI showed no acute changes, in particular, no mass, hemorrhage, or infarct. She was empirically treated with vancomycin, ceftriaxone, ampicillin and acyclovir for possible bacterial meningitis or HSV encephalitis. Lumbar puncture was traumatic however the culture did not grow bacteria and HSV PCR was negative. She had two more episodes of confusion during the admission where she was speaking nonsense and unable to read. She was not able to remember these episodes. Given these recurrences occurred after electrolytes were corrected and infectious sources were treated, these were considered less likely causes. The clinical picture was thought most consistent with complex partial seizure. An outpatient EEG did not reveal epileptiform changes. She was started on Keppra for seizure prophylaxis. In the following 4 months she has not had recurrent episodes.

DISCUSSION: Altered mental status (AMS) is a common complaint comprising up to 10 % of visits to the ED.² The differential for AMS is broad and should include seizure, which in itself has a varied presentation creating a diagnostic dilemma. A seizure can present with motor manifestations, as in clonic or tonic seizures. It could also be sensory with paresthesia or autonomic sensations like diaphoresis. Seizure can include no loss of consciousness, as in simple partial seizures, or complete loss of consciousness, as in complex partial seizure, or a range of mental status changes in between, which can include distortions of time or partial amnesia. Highest incidence of epilepsy occurs at the extremes of life. A cohort study of 1195 patients with epileptic seizures found that 24 % of patients were older than 60 and the proportion of identifiable causes was greater in older patients (60 % compared to 38 %) with vascular disease being the identified cause in 49 % of older patients.⁵ Similarly Osvaldo finds that stroke accounts for 30 % of newly diagnosed seizure in patients over 60 years old. The diagnosis of seizure is challenging, as a routine EEG is only able to demonstrate epileptiform abnormalities in 25–50 % of patients. Thus a normal EEG does not rule out epilepsy. A retrospective study reviewed EEGs done within 12 h of patients presenting to the ED with altered mental status and found that only 44.8 % of patients with clinical epileptic seizures had epileptiform discharges and 54 % of patients with stroke related seizure had pathologic changes on their EEG including paroxysmal abnormalities and background slowing.² Another retrospective study analyzed 94 EEGs done on patients with AMS and found pathologic changes on 44.7 % of EEGs.⁴ Seizure has been shown to have a correlation with stroke as ischemia can cause gliosis and the development of menigocerebral cicatrix, which can change excitability and neuronal synchrony.³ A group of 4709 patients with idiopathic epilepsy occurring after age 60 with no history of stroke were matched with controls without history of stroke or seizure and found that in the epilepsy group 10 % of patients later developed a stroke compared to 5.6 % in the control group, which gives a hazard ratio of 2.89.¹ New onset of seizure is relatively common in the elderly and should be considered as part of the differential for altered mental status. Both the varied presentation and the limitations in diagnostic studies make this a challenging diagnosis. However a new seizure may suggest underlying cerebrovascular disease and the patient may benefit from risk factor reduction.

CRISIS OF BLEEDING OR CLOTTING? ADRENAL MANIFESTATIONS OF ANTIPHOSPHOLIPID SYNDROME Sean Townsend; Oanh K. Nguyen. UT Southwestern Medical Center, Dallas, TX. (*Tracking ID #2199262*)

LEARNING OBJECTIVE #1: Recognize acute adrenal crisis due to adrenal vein thrombosis as a serious complication of antiphospholipid syndrome (APS).

LEARNING OBJECTIVE #2: Manage anticoagulation therapy in APS-associated thrombocytopenia.

CASE: A 63 year old man with a 15-year history of APS presented with worsening generalized weakness for 10 days, associated with moderately severe diffuse, colicky abdominal pain and one day of nausea and lightheadedness. Review of systems was negative for fever, weight changes, bleeding, bruising, or focal neurologic symptoms. Of note, warfarin was discontinued seven days prior to hospitalization due to concern for occult bleeding in the setting of symptomatic hypotension. However, he had no documented bleeding or anemia and his international normalized ratio (INR) ranged from 1.5–2.4 in the 2 months preceding hospitalization. Past medical history was otherwise unremarkable. Vitals were notable for heart rate 105 bpm, blood pressure (BP) 122/75 mmHg recumbent, and drop in systolic BP >20 mmHg with standing. Physical examination revealed dry mucous membranes, flat neck veins, soft and nontender abdomen, and no rash, hyperpigmentation, or petechiae. Laboratory evaluation was notable for serum sodium 116 mEq/L, potassium 6.2 mEq/L, chloride 87 mEq/L, bicarbonate 17 mEq/L, blood urea nitrogen 19 mg/dL, creatinine 1.82 mg/dL, INR 1.6, partial thromboplastin time 79 s, hematocrit $41 \times 10^3/\mu\text{L}$, and platelets $84 \times 10^9/\mu\text{L}$ (baseline 2 months prior, $163 \times 10^9/\mu\text{L}$). Random cortisol level was 1.0 mcg/dL. Adrenocorticotropin

hormone level was 1416 pg/mL. Magnetic resonance imaging of the abdomen showed symmetric bilateral adrenal gland enlargement. He was admitted to the intensive care unit with a diagnosis of acute adrenal crisis secondary to bilateral adrenal hemorrhagic infarction. His symptoms and metabolic derangements resolved with corticosteroid replacement. He was restarted on warfarin indefinitely for treatment of APS.

DISCUSSION: Acute adrenal crisis secondary to bilateral adrenal hemorrhagic infarction is a rare but serious manifestation of APS. Though the pathophysiology is poorly understood, adrenal hemorrhagic infarction is thought to be secondary to adrenal vein thrombosis due to hypercoagulability rather than primary hemorrhage. Pro-thrombotic states such as trauma, sepsis, heparin-induced thrombocytopenia (HIT), and APS are well-described causes of adrenal hemorrhage.¹ Anticoagulation therapy has rarely been associated as well.² However, thrombocytopenia outside of HIT has not been described in association with adrenal hemorrhage and the presence of thrombocytopenia in APS is not known to increase the risk of hemorrhagic complications. This patient most likely had adrenal vein thrombosis due to subtherapeutic INR leading to hemorrhagic infarction and adrenal crisis, and exacerbation of symptoms with cessation of warfarin. Five-year survival among APS patients with adrenal crisis who survive the acute setting is >90 %. Most patients will require corticosteroid supplementation indefinitely, though up to 6 % will have full recovery of adrenal function.³ Although APS-associated thrombocytopenia alone does not necessarily increase the risk of bleeding, the optimal approach to anticoagulation in these patients remains unknown. By consensus, indefinite anticoagulation with warfarin is the mainstay of treatment for APS even with associated thrombocytopenia, given the overall propensity for thrombosis. Even so, treatment should be tailored according to individual bleeding risk. Those with mild or moderate thrombocytopenia generally do not require therapy for the thrombocytopenia itself, though patients with severe thrombocytopenia at high risk for bleeding may be treated similarly to those with chronic immune thrombocytopenia.⁴ In conclusion, internists should recognize adrenal crisis as a potentially life-threatening complication of APS, and be able to manage anticoagulation therapy in APS even with associated thrombocytopenia. References: 1. Rosenberger LH, Smith PW, Sawyer RG, et al.: Bilateral adrenal hemorrhage: the unrecognized cause of hemodynamic collapse associated with heparin-induced thrombocytopenia. *Crit Care Med.* 2011 Apr;39(4):833–8. 2. Picolos MK, Nooka A, Davis AB, et al.: Bilateral adrenal hemorrhage: An overlooked cause of hypotension. *J Emerg Med.* 2007 Feb;32(2):167–9. 3. Ramon I, Mathian A, Bachelot A, et al.: Primary adrenal insufficiency due to bilateral adrenal hemorrhage-adrenal infarction in the antiphospholipid syndrome: long-term outcome of 16 patients. *J Clin Endocrinol Metab.* 2013 Aug;98(8):3179–89. 4. Lim W. Antiphospholipid antibody syndrome. *Hematology Am Soc Hematol Educ Program.* 2009:233–9.

CROSS-DISCIPLINARY APPROACH TO A COMPLICATED CASE OF TYPE-I CRYOGLOBULINEMIA Anne Liu; Luming Li; Mark Youngblood; Randy Luciano. Yale, New Haven, CT. (*Tracking ID #2198896*)

LEARNING OBJECTIVE #1: Recognize a unique clinical presentation of cryoglobulinemia type I

LEARNING OBJECTIVE #2: Address the clinical approach of involving a multidisciplinary team including: rheumatology, hematology, oncology, and dermatology

CASE: A 69 year old gentleman with a history of granulomatosis with polyangiitis (GPA) with secondary renal failure on peritoneal dialysis was originally admitted with complaints of lethargy and acral purpura in the bilateral ear helices, toes, and nose with central necrosis. Two months prior, the patient had received steroid treatment for a whole body pruritic, maculopapular rash and significant eosinophilia (50 %). During his current admission, lab work revealed anemia (Hct 30 %), thrombocytopenia (49 k/uL), elevated cryocrit (0.1–0.4 %), leukocytosis (WBC 16.5), elevated ESR (39 mm/hr), CRP (42.5 mg/L), polyclonal gammopathy (IgM 271 mg/dL, IgA 176 mg/dL, IgG 2860 mg/dL), hypocomplementemia (C3 69 mg/dL, C4 <10 mg/dL), and elevated lupus anticoagulant. Bone-marrow biopsy and flow cytometry provided no evidence of myelodysplasia or monoclonal B-cell lymphoproliferative disease. A skin biopsy revealed multiple, occlusive, small-vessel thrombi consistent with cryoglobulinemia type I. Rituximab therapy was initially considered for treatment of cryoglobulinemia, however concern for an underlying malignancy prompted an inpatient positron emission tomography-computed tomography (PET-CT), which showed extensive hypermetabolic lymph nodes. A lymph-node biopsy and plasmapheresis were planned; however the patient developed worsening shortness of breath and passed away from severe septic shock due to gram negative pneumonia. At autopsy, internal examination revealed atypical lymphohistiocytic hyperplasia in multiple lymph nodes with effaced nodal architecture and red cell extravasation, which may be associated with steroid effects. Also of note is the possibility of GPA associated lymphadenopathy (1). Both lungs were heavy (left 1150 g, right 700 g); with a right lower lobe focal lymphoplasmacytic infiltrate. Staining revealed lambda positive plasma cells, consistent with the patient's known history of GPA (2).

DISCUSSION: We describe a patient with GPA presenting with acrocyanosis and found to be positive for cryoglobulinemia type I. Cryoglobulins are composed of immunoglobulins and complement that become insoluble at reduced temperatures. Cryoglobulinemia is considered a small to medium vessel vasculitis. Clinically this manifests as Meltzer's triad with palpable purpura, arthralgia and myalgia. Cryoglobulinemia is broken down into three types. Type I is an isolated monoclonal IgG or IgM, associated with plasma cell dyscrasias including multiple myeloma or Waldenström macroglobulinemia. Type II is a mixture of polyclonal IgG plus monoclonal IgM or IgA with rheumatoid factor function. This is typically from viral infections such as HIV, HCV, HBV, CMV, EBV, or parvovirus. Type III is polyclonal IgM and IgG molecules strongly associated with connective tissue disease such as systemic lupus erythematosus and rheumatoid arthritis. This patient was serologically positive and biopsy-specific for Type I. His presentation included hyperviscosity, thrombosis, digital ischemia, livedo reticularis, and purpura that became necrotic. Often the necrosis in cryoglobulinemia is cutaneous, as seen in this patient. It is unclear from the literature the co-occurrence between GPA and cryoglobulinemia type-I, and also unclear the best sequence for treating a case of complex vasculitides with multiple end-organ sequelae. The consultant teams recommended different initial treatment options that often focused on a single system of interest. In addition, most teams would exam and round on the patient separately, write a daily progress note, and state their organ-specific recommendations. This type of 'siloed' approach led to increasingly disparate hypotheses and treatment goals by consulting teams. In order to clarify and unify our hypotheses, the primary medicine team decided to call together a multi-team clinical conference with hematology, oncology, rheumatology, and dermatology to have face-to-face communication about the case. We reached a consensus diagnostic and treatment approach that was agreed upon by all teams. However, before we were able to complete the necessary testing, the patient expired. We realized from this complex case that early, clear communication among different treatment providers can be paramount for minimizing delay in diagnostic testing, especially in a rapidly progressive disease state. 1. Hasizume T et al. Supraclavicular and axillary lymphadenopathy as the initial manifestation in Wegener's granulomatosis. Clin Rheumatol. 2002 21(6):525-7. 2. Carruthers et al. IgG4 Plasma Cell Infiltration in Granulomatosis with Polyangiitis (Formerly Wegener's) Lung Biopsies. Arthritis and Rheumatism. 2012 64 Suppl 10:1534.

CULTURE-NEGATIVE ENDOCARDITIS CAUSED BY BARTONELLA QUINTANA Koji Koji²; Christine Kwan¹. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Sapporo, Japan. (Tracking ID #2199712)

LEARNING OBJECTIVE #1: Diagnose endocarditis despite negative blood cultures

LEARNING OBJECTIVE #2: Diagnose Bartonella quintana endocarditis with prolonged blood cultures, antibodies, or polymerase chain reaction (PCR)

CASE: A 77 years old Japanese woman presents with 2 months of continued fever up to 39 °C despite multiple antibiotics. For the past month while being hospitalized, she has had multiple diagnostic work-up including 6 sets of blood cultures, urinalysis, and chest x-ray, which have all been negative. She does not report any other symptoms and has no recent travel. Past medical history includes untreated hypertension and cerebellar infarction (5 months ago) with no residual deficits. The patient's home medication includes aspirin; she has no known drug or food allergies. She does not use tobacco, alcohol, or recreational drugs. She is a housewife. Physical exam shows vital signs of temperature 37.5 °C, heart rate 84, blood pressure 160/80, respiratory rate 12, and O₂ saturation 97 % room air. Generally, the patient is alert/oriented x3. Heart exam reveals a IV/VI systolic ejection murmur at the apex and radiating to the right carotid and II/VI diastolic murmur at the apex. The rest of her exam shows no abnormalities. Labs, including complete blood count, coagulation panel, and chemistries, are within normal limits except for hemoglobin 10.7 g/dL, hematocrit 29.6 %, platelet 5.9 × 10⁴ /μL, albumin 2.6 g/dL, lactate dehydrogenase 332 IU/L, and alkaline phosphatase 271 IU/L. More blood cultures are drawn, and the patient's antibiotic is switched to ceftriaxone and gentamicin. Transesophageal echocardiogram reveals aortic and tricuspid vegetations and abscesses with severe regurgitation. All blood cultures, however, continue to show no growth. She undergoes valve replacement surgery, which confirms vegetations and abscesses at the right and left coronary cusps. Cultures of aortic valve tissue show no bacterial or fungal growth. Sections of the aortic valve stained with hematoxylin-eosin show a dense eosinophilic fibrinoid matrix. PCR of the aortic valve abscesses reveals *Bartonella quintana*; serum bartonella antibodies are also positive. Following surgery, her temperature returns to 37 °C, and her ceftriaxone is changed to doxycycline for a 6 weeks course.

DISCUSSION: The Duke criteria have two major criterion: positive blood cultures or evidence of endocardial involvement, such as exacerbation of valvular disease, abscesses, or vegetations, which the above patient has. The minor criteria present in this patient include fever and a history of arterial embolization, possibly her previous stroke. While bartonella species, an important cause of culture-negative endocarditis, can be identified by cultures (~100 % if cultured for 4 weeks), serologic studies (17.3 %), or molecular

biology techniques (~100 %), culture-negative endocarditis remains a diagnostic and therapeutic problem, accounting for 5–30 % of endocarditis. Three major reasons why cultures can be negative in endocarditis include previous administration of antimicrobial agents, inadequate microbiological techniques, and infection with highly fastidious bacteria or nonbacterial pathogens. Cultures of *Bartonella quintana* usually require 4 weeks to grow, in comparison to the usual 2 weeks. Fortunately, while the above patient's multiple blood cultures show no growth, PCR of the aortic valve abscess reveals *Bartonella quintana*, and serum antibodies are positive.

DEBILITATING JOINT PAIN FOLLOWING EXOTIC TRAVEL Benjamin Monson; Shana M. Peper; Christopher J. Smith. University of Nebraska Medical Center, Omaha, NE. (Tracking ID #2191714)

LEARNING OBJECTIVE #1: Recognize the epidemiology, transmission cycle, and societal impact of chikungunya virus globally and within the United States.

LEARNING OBJECTIVE #2: Identify the clinical presentation, differential diagnosis, and treatment of patients infected with chikungunya virus.

CASE: A 39 year-old African-American woman presented with 3 days of debilitating generalized myalgia and arthralgias. The affected joints included her hips, knees, ankles, hands, wrists, and neck. The patient also noted headache, fevers, chills, pruritus, nausea, and loose stools over the same duration. She did not endorse vision changes, cough, oral ulcers, gingival bleeding, facial rash, shortness of breath, abdominal pain, or urinary changes. Non-steroidal anti-inflammatory drugs failed to relieve her pain. Her past medical history included hypothyroidism for which she did not take medication. She was employed as a home health nurse, but denied ever suffering a needle-stick injury. She quit smoking tobacco 1 year ago and never used recreational drugs. Her vital signs were within normal limits. She exhibited photophobia, dry oral mucosa, and tender anterior and posterior cervical lymphadenopathy. She had no aphthous ulcers. She had diffuse arthralgias without synovitis. Her complete blood count with differential, complete metabolic panel, thyroid stimulating hormone, chest x-ray, urinalysis, and electrocardiogram were within normal limits. Upon further questioning, the patient revealed that she had returned 1 week ago from vacationing in Saint Lucia in the Caribbean. Her travel partner was experiencing similar symptoms. Both recall being bit by mosquitoes throughout the trip. They only consumed bottled water, and neither had eaten undercooked shellfish. The patient received intravenous fluids, analgesics, and anti-emetics with prompt resolution of her nausea, diarrhea, and fatigue. However, her myalgia and polyarthralgia persisted. On the fourth day of hospitalization, she received methylprednisolone 40 mg intravenously with significant improvement in her joint pain. She was discharged on hospital day 6 with an oral prednisone taper. Several weeks after discharge, the serum enzyme-linked immunosorbent assay for chikungunya virus (CHIKV) returned positive. Testing for dengue virus (DENV) was negative.

DISCUSSION: CHIKV is a rapidly spreading contagion that will increasingly be encountered by general internists. The mosquito-borne alphavirus arrived in the Caribbean in December 2013 and to date has infected 576,000 people in the Western Hemisphere. As of August 2014, there have been 484 laboratory-confirmed cases of CHIKV in the United States, including 4 locally transmitted cases in the state of Florida. The virus's vectors, *Aedes aegypti* and *Aedes albopictus*, are aggressive daytime-biting mosquitoes well-established in the Caribbean and southeastern United States. The hallmarks of presentation are acute onset of fever and polyarthralgia. The joint pain is usually diffuse, symmetric, and can be severe and debilitating. Additional symptoms may include myalgia, headache, nausea, and a maculopapular rash. Eliciting a travel history is crucial to make a diagnosis. DENV causes similar symptoms and is also transmitted by *Aedes aegypti* and *Aedes albopictus*. Differentiating between CHIKV and DENV can be difficult so if either is suspected, serology should be sent for both. Treatment is supportive and includes rest, fluids, and analgesics. Recovery typically takes 7–10 days; however, joint symptoms can persist for months. Over 20 % of those infected will have joint pain 1 year after infection. While there are antiviral agents and monoclonal antibodies in early stages of testing, the best defense against CHIKV remains prevention. Primary care physicians should advise patients traveling to endemic areas to use insect repellent, wear protective clothing, and make sure window and door screens are closed.

DEEP VEIN THROMBOSIS IN A BODYBUILDER Danielle Pannebaker; Robin Ivester. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198393)

LEARNING OBJECTIVE #1: Identify risk factors for deep vein thrombosis

LEARNING OBJECTIVE #2: Recognize abuse of anabolic-androgenic steroids as a risk factor for thrombotic events.

CASE: A 39 year-old man was referred to the emergency department from a local community clinic for painful swelling of his right calf that developed over the previous

week. He did not report any fever, shortness of breath, cough, chest pain, or recent injury or surgical procedures. He had no prior history of similar events. His family history was unknown, as he was adopted as a young child. He was otherwise healthy, and had arrived in town only recently after spending several months traveling in Southeast Asia while participating in amateur bodybuilding competitions. He reported a long plane flight from Bangkok to New Orleans 1 month prior to presentation. He denied smoking or drug use, and endorsed heavy drinking intermittently over the past year and a half. He did not take any prescription medications. On further questioning, he endorsed a 4-year history of using non-prescribed anabolic-androgenic steroids, which were readily available in Thailand. Doppler ultrasound of the leg revealed thrombosis of the right popliteal vein. The patient was bridged to warfarin therapy with low-molecular weight heparin.

DISCUSSION: Deep vein thrombosis and other thrombotic events are problems commonly encountered by the internist. A careful history is important to identify risk factors that could have contributed to the development of a deep vein thrombosis, and in particular to identify modifiable risk factors such that a patient can make changes to reduce their risk of future events. Virchow's triad describes the categories of factors that contribute to thrombotic risk - vascular endothelial injury, stasis, and hypercoagulability. In this case, the patient's did not have any history of trauma, surgery, or other cause of endothelial injury. He did have the classic risk factor of a long plane flight (stasis). His family history was unavailable, so his likelihood of a hereditary hypercoagulable state is unknown. His use of anabolic-androgenic steroids, however, would lead to a hypercoagulable state through a variety of hormonal effects. Previous articles have noted that use of anabolic-androgenic steroids is correlated with consistent increases in blood cell mass, red blood cell count and increasing clotting factors, which would lead to increased thrombotic risk. One of the steroids this patient used regularly, nandrolone, is a synthetic Class A anabolic-androgenic steroid with an unsaturated C4-C5 double bond which can be aromatized back into testosterone and subsequently into estradiol. Given the importance of counseling patients with deep vein thrombosis to minimize any modifiable risk factors and decrease their risk of recurrence, it is important to inquire about the use of anabolic steroids in addition to other hormones such as estradiol (including oral contraceptive use in women) and testosterone supplementation.

DELIRIUM & DECISIONS Margaret P. Huntwork. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198382)

LEARNING OBJECTIVE #1: Review the Appelbaum and Grisso criteria for decisional capacity.

LEARNING OBJECTIVE #2: Familiarize practitioners with the state hierarchy for surrogate decision-makers.

CASE: A 64 year-old man with known peripheral vascular disease was brought in by ambulance to the ED for bilateral lower leg pain progressive over 8 weeks. Pain progressed to the point where he could no longer ambulate. He denied fevers, chills, or sick contacts. He had no chest pain or shortness of breath. He had a recent vascular evaluation that revealed occlusions in his right and left superficial femoral arteries. Amputation was offered to him at that time, but he and his family opted to wait and see if he improved over the next few weeks. Physical exam was notable for malodorous lower extremities with dry gangrene in multiple phalanges, extensive necrotic ulcerations on both anteromedial shins, and no palpable peripheral pulses. Feet were cool to touch. Initial labs were significant for leukocytosis and an elevated troponin without accompanying angina or changes in his ECG. He was admitted for concern for systemic infection from his lower extremity vascular disease and an evolving heart strain from this infection. The surgical team evaluated the patient and again recommended amputation. The patient refused, saying he thought his legs would heal on their own, and he would only want the surgery if there were no other options. On hospital day two, he became tachycardic. His leukocytosis worsened, and his troponin increased. His mental status deteriorated. The cardiologists determined the patient was suffering a non-ST-elevation myocardial infarction caused by ischemic demand due to sepsis, with his necrotic legs as the nidus of infection. Psychiatry evaluated the patient for decision-making capacity. Initially, psychiatry deemed the patient to retain decision capacity, and he continued to decline the amputation. However, each day thereafter, psychiatry determined the patient to be delirious and without capacity to make medical decisions. The patient's sepsis persisted despite an aggressive antibiotic regimen. His mental status was reassessed twice daily and showed no improvement. With the patient urgently needing surgery, but unable to consent for the amputation, three of five of his adult children assented for the operation on his behalf. The remaining two children were estranged from the family and could not be reached by any family members after multiple attempts.

DISCUSSION: Decisional capacity is the ability to consent for or refuse care. Appelbaum and Grisso describe four elements of decisional capacity: 1. The ability to

communicate a choice. 2. The ability to understand the relevant information. 3. The ability to appreciate a situation and its consequences. 4. The ability to reason rationally. Psychiatrists generally believe that clinicians overestimate patients' decisional capacity. Increased age and cognitive impairment are two risk factors for lack of capacity. Hospitalized patients with delirium should not be evaluated for decisional capacity, as, by nature of their delirium, they do not meet the Appelbaum and Grisso criteria. If a patient lacks decisional capacity and does not have a medical power of attorney, the clinician should then turn to the hierarchy of surrogate decision-makers defined by the state. In Louisiana, the spouse is next in line, followed by any adult children (all must be contacted and in agreement), and lastly, parents of the patient. This patient exemplifies how complex decisional capacity can be. Ultimately, the patient received what could have been a life-saving surgery, despite the fact that it was not in accordance with his original wishes. We recommend that clinicians familiarize themselves with the Appelbaum and Grisso criteria to better evaluate decision-making capacity.

DEXMEDETOMIDINE: A PERPLEXING PYROGEN Margaret Lowenstein; Alexander Yoo; Marcia Glass. University of California San Francisco, San Francisco, CA. (Tracking ID #2194093)

LEARNING OBJECTIVE #1: Recognize drug fever as an important non-infectious cause of fever in hospitalized patients.

LEARNING OBJECTIVE #2: Identify fever as an unusual side effect of dexmedetomidine.

CASE: A 60-year-old woman with history of heart, liver, and kidney transplants secondary to hemochromatosis, quadriplegia, and a stage IV decubitus ulcer was admitted to the intensive care unit for hypoxemic respiratory failure after an aspiration event. She initially improved with mechanical ventilation and broad-spectrum antibiotics, which were narrowed to levofloxacin on hospital day three. The patient remained intubated because of poor respiratory mechanics, so her sedation was changed to dexmedetomidine with the hope of decreasing respiratory depression. On hospital day five, the patient developed daily fevers up to 40 ° C with low-grade tachycardia but otherwise stable hemodynamics and ventilator requirements. She had no localizing signs of infection on exam. Although the patient had a leukocytosis on admission, white blood cell count was 8 g/dL with normal differential; electrolytes and liver function tests were also within normal limits. Urine culture and two sets of repeat cultures of peripheral and central blood remained negative. Chest x-ray and secretions were unchanged. The decubitus ulcer was re-evaluated by surgery without evidence of infection. Four-extremity Doppler revealed no deep vein thrombosis. Careful review of the patient's medications revealed a correlation between initiation of dexmedetomidine and her fevers. Sedation was changed to fentanyl and the patient's temperature decreased within hours, defervescing entirely after 12 h. By identifying drug fever as a possible source, we were able to avoid further invasive and costly testing and treatment. She was successfully extubated three days later and discharged on hospital day 18.

DISCUSSION: Fever is a common finding among critically ill patients and is usually equated with infection. However, there are a number of important non-infectious causes to consider, including venous thromboemboli, transfusion reactions, acalculous cholecystitis, endocrinologic disturbances, alcohol withdrawal and febrile drug reactions. Drug fever is generally defined as a fever coinciding with the administration of a drug and disappearing after the drug is discontinued, after other causes of fever are excluded. Fever is the sole manifestation of drug hypersensitivity reaction in 3–5 % of cases, and most cases of drug fever are not accompanied by rash or eosinophilia. Reactions generally occur within days to weeks of exposure to the drug and resolve within 72 h of discontinuation, although the time course can be idiosyncratic. Common culprits include antimicrobials (particularly beta lactams, sulfa drugs, vancomycin), anti-epileptics (particularly phenytoin), and anti-arrhythmics (particularly procainamide and quinidines), but many other drugs have been implicated. Drug fever is a diagnosis of exclusion, requiring evaluation for infectious and other life-threatening causes of elevated temperature. However, failure to consider drug culprits in a febrile patient can lead to unnecessary testing, therapies, and prolonged hospital stays. Dexmedetomidine is a central alpha-2 receptor agonist with anxiolytic, sedative and analgesic effects that is used for sedation in the intensive-care unit. Benefits include minimal respiratory depression and possibly shortened duration of mechanical and decreased delirium as compared to other sedatives. Common side effects include hypotension, bradycardia, hypertension, atrial fibrillation and other cardiovascular instability. Although rare, dexmedetomidine-induced drug fever has also been reported. Similar to these reports, our patient developed a fever quickly on dexmedetomidine, which rapidly decreased within a day of cessation of the drug.

DIABETIC AMYOTROPHY WITH ABDOMINAL PSEUDO-HERNIATION AND PAIN: CASE REPORT AND REVIEW OF LITERATURE

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LEARNING OBJECTIVE #1: Recognize diabetic amyotrophy (DA) as a cause of recurrent abdominal pain and unilateral which may prevent unnecessary extensive work up

LEARNING OBJECTIVE #2: Treat DA with analgesics and tricyclic antidepressants.

CASE: A 58-year-old Caucasian male with a history of DM II (HA1C: 8.7) for the past 7 years on glipizide presented with a 3 month history of left sided abdominal pain. It was associated with a 25 lb weight loss and bulging of the left flank region. He did not have any history of fever, nausea, vomiting, constipation, bowel/bladder incontinence, trauma, toxin exposure, tick bite, rash or recent travel. On examination, he had marked bulging of the abdominal muscle in the left flank region with decreased sensation and local allodynia at T6-10 dermatomal region. He had undergone extensive evaluations in the past including magnetic resonance imaging of the abdomen and back, upper endoscopy and colonoscopy which were all unremarkable. Basic metabolic profile, liver function tests, Lyme ELISA test, rapid plasma reagin test, thyroid stimulating hormone, vitamin B12, folate, and antinuclear antibody titers were all within normal limits. Electromyography (EMG) showed evidence of denervation of the external oblique and thoracic paraspinal muscles and nerve conduction studies revealed evidence of mixed polyneuropathy compatible with demyelinating diabetic polyneuropathy. Patient was started on analgesics and gabapentin. At 6 weeks follow up, patient's pain and swelling was reduced.

DISCUSSION: DA with pseudo-herniation is a rare entity with only 16 cases reported in literature. In our review, average age at presentation was 62.38 years; exclusively males with DM II for a duration of 7±4.36 years. The most common site was at or below the T5 level. Common complaints include abdominal pain (87.5 %), weight loss (83.3 %) and peripheral neuropathy. Average hemoglobin A1C was 8.39 % at the time of diagnosis. Electromyography showing denervation of muscle is the diagnostic test of choice. Tricyclic antidepressants are effective for symptomatic relief. The role of other neuroleptics commonly used for diabetic neuropathy such as gabapentin is unclear. It has a good prognosis and usually resolves after 3 to 12 months. Although rare, it should be considered in the differential diagnosis for patients presenting with abdominal pain and unilateral herniation with longstanding DM. If considered early, it may prevent unnecessary investigations and proper treatment of this potentially reversible condition.

DIAGNOSING GANGRENOUS CHOLECYSTITIS—PHYSICAL EXAM VERSUS RADIOGRAPHIC IMAGING Ruchir Patel²; Nena S. Auraha²; Herman Dyal²; Sean Drake¹. ¹Henry Ford Hospital, Detroit, MI; ²Henry Ford Hospital, Dearborn, MI. (Tracking ID #2196329)

LEARNING OBJECTIVE #1: Diagnosing acute cholecystitis despite multiple normal radiologic studies.

LEARNING OBJECTIVE #2: Understanding when “premature closure” may inhibit the clinicians ability to make a correct diagnosis.

CASE: A 69 year old Arabic female with a past medical history significant for obesity and type two diabetes mellitus presented to our Emergency Department with new onset right upper quadrant abdominal pain that began after eating a high fat meal six hours prior to presentation. The pain was described as dull, non-positional and colicky with radiation to her back. She denied fevers, chills, nausea, emesis, malodorous urine, changes in skin color or pruritis. On initial evaluation the patient was laying supine, clenching her abdomen in distress. Objectively, she was afebrile, tachycardic and did not appear jaundiced. Her abdominal exam was significant for a soft abdomen with a positive Murphy's sign. The patient's laboratory values showed a mild leukocytosis of 11.8 K/uL. Liver function tests and lipase were normal. Ultrasound of the gallbladder showed a distended gallbladder without evidence cholecystitis. Computed tomography (CT) of the abdomen was performed to rule out pancreatitis and revealed a normal appearance of the gallbladder and pancreas. Due to a high suspicion for cholecystitis, cholescintigraphy was performed, which was also determined to be negative. In light of the discordance between her physical exam findings and radiologic findings the patient was managed conservatively on an inpatient basis opposed to discharge with close outpatient follow-up as there was still a strong clinical suspicion for cholestatic disease. On day three of her admission the patient spiked a fever to 38.3 °C. Her abdominal exam progressed, and was significant for generalized guarding and severe tenderness to palpation of the right hypochondriac region. An urgent abdominal CT scan with contrast was performed and imaging revealed a hydropic gallbladder with wall thickening, hyperemia of the mucosa and pericholecystic

inflammatory changes consistent with gangrenous cholecystitis. The patient was urgently prepared for surgery and underwent laparoscopic cholecystectomy without complication.

DISCUSSION: Acute cholecystitis is characterized by inflammation of the mucosal wall of the gallbladder, most commonly due to cystic duct obstruction. Clinical suspicion for acute cholecystitis is usually confirmed by highly sensitive radiographic evaluation. The accuracy of radiologic imaging modalities in diagnosing acute gangrenous cholecystitis has been well documented with studies showing sensitivities of abdominal ultrasound and cholescintigraphy at 88 and 97 %, respectively. The combined likelihood ratio of physical exam findings, laboratory values and radiographic findings ranges between 25 and 30, thus the total number of false negatives is expected to be minute. However in the rare event of multiple negative laboratory and radiographic studies the clinical exam should take precedence in correctly diagnosing acute cholecystitis in an effort to prevent premature closure.

DIALING DOWN CHEST PAIN: A CASE OF “ATYPICAL” CHEST PAIN AND SHORTNESS OF BREATH David Roofeh; Giovana Uzelac; John Donnelly. Christiana Care Health System, Newark, DE. (Tracking ID #2193933)

LEARNING OBJECTIVE #1: Recognize the clinical complications of interscalene nerve blocks, which include Horner's syndrome and hemidiaphragm paralysis.

LEARNING OBJECTIVE #2: Avoid algorithmic work-up of chest pain and shortness of breath when pre-test probability is low or other causes are more likely to account for presenting symptoms.

CASE: A 58 year-old male with a past history of coronary artery disease (CAD) with prior stent placement and a remote history of pulmonary embolism (PE) following elective knee surgery presented with acute-onset shortness of breath associated with chest pain, 2 days following his elective right rotator cuff shoulder surgery. The patient received an interscalene bupivacaine pump with patient-controlled dosing for post surgical anesthesia. He noted that his pain was well managed, but woke up with paroxysms of shortness of breath and chest pain, which remitted with reducing the dose of his anesthesia. On exam he was tachypneic to 25 breaths per minute, saturating 90 % on room air. He had a mild right Horner's syndrome and his lower right lung fields were diminished half way up through his back which did not change with change in position. His chest X-ray was interpreted as showing a right-sided pleural effusion with basilar atelectasis. A right thoracic ultrasound showed no fluid collection at the base of the lung. His EKG showed non-specific T-wave inversions, but no ST elevations or depressions. His troponin markers were trended and never elevated above 0.01 ng/mL. His D-dimer was 199 ng/mL. The patient was reexamined several hours following the removal of the interscalene block. He no longer complained of chest pain or shortness of breath. His lung expansion improved, with resolution of his tachypnea and relative oxygen desaturation. His ptosis and miosis completely resolved. He was discharged home in less than 24 h.

DISCUSSION: Interscalene nerve blocks have been used effectively to reduce post-surgical pain following shoulder surgeries. These peripheral nerve blocks include anesthetic solutions such as lidocaine, mepivacaine, or bupivacaine. This anesthetic procedure is generally safe, but may present with temporary paresis of thoracic structures and cause symptoms concerning for serious pathology of the respiratory and cardiovascular systems. Horner's syndrome and hemidiaphragm paralysis is a well-known complication of interscalene nerve blocks. This case illustrates how these complications, presenting in a patient with known CAD and history of PE, may cause diagnostic concern for recurrence of acute coronary syndrome or PE following his surgical procedure. Ultimately, the patient suffered no long-term negative sequelae; a thorough history and recognition of this complication prevented the patient from receiving unnecessary diagnostic tests.

DIARRHEA WITH CLOSTRIDIUM DIFFICILE POSITIVE STOOL: TO TREAT OR NOT TO TREAT

SIMRANKAUR B MATTA, M.D.; ALAN GREENBERG, M.D.

DEPARTMENT OF INTERNAL MEDICINE, UNIVERSITY OF NEVADA SCHOOL OF MEDICINE, LAS VEGAS Simran Kaur B. Matta; Alan Greenberg. University of Nevada School of Medicine, Las Vegas, NV. (Tracking ID #2199509)

LEARNING OBJECTIVE #1: Recognizing the importance of good history taking and clinical judgment in decision making

LEARNING OBJECTIVE #2: Recognizing the limitations of Clostridium difficile stool tests while treating patients with diarrhea

CASE: A 70-year-old female with past medical history of metastatic renal cell carcinoma presented with non-bloody, watery diarrhea. She complained of 12–15 bowel movements per day and lower abdominal cramps. She was afebrile and her WBCs were 13.7/mm³.

Her stool *Clostridium difficile* (C. difficile) toxin assay (tcdB real time PCR) was positive. This was her third hospital admission within 1 year due to diarrhea with positive C. difficile assay. The patient had been diagnosed previously with C. difficile infection (CDI) in the context of diarrhea and C. difficile positive stool and was treated unsuccessfully for CDI both in inpatient and outpatient settings. Of note, the patient had not been on any other antibiotics during this period except for vancomycin and metronidazole which was prescribed to her for CDI. Stool cultures obtained in the past visits were negative and CT abdomen was significant for mild colitis. During this admission, we started the patient on vancomycin and metronidazole. At day 6, her diarrhea was unchanged. At this point, we carefully reviewed other potential causes of her diarrhea including her medications. The patient was on Axitinib for renal cancer. We discontinued her Axitinib based on its association with diarrhea and stopped the antibiotics as well. The patient showed dramatic improvement in her symptoms and her bowel movements decreased to 3 per day over the next 2–3 days.

DISCUSSION: Our patient was started on Axitinib 2 years ago and had chronic diarrhea starting 6 months later. Her diarrhea was treated as CDI on multiple occasions subjecting her to a cumulative 70 days of antibiotic exposure and a total of 15 days of hospitalization in one year with no/minimal resolution of her symptoms. She had improved dramatically this time just by discontinuation of her Axitinib. Diarrhea is one of the most common side effects of Axitinib. On retrospective discussion we realized that Axitinib was responsible for her diarrhea while C. difficile was only a colonizer. This case reminds us that the routine diagnostic tests for C. difficile do not distinguish between active disease and colonization. Perhaps the most important point to be learnt is that mere presence of diarrhea and C. difficile positive stools does not always imply CDI. The issue is to consider, when appropriate, other potential causes of diarrhea in a particular patient, both infectious and non-infectious, especially when the patient has failed to respond to an appropriate treatment for CDI. Also to be noted that in the absence of C. difficile associated diarrhea (CDAD), the antibiotics did not eradicate C. difficile colonization/fecal excretion. Our patient continued to test positive for C. difficile despite being treated with vancomycin and metronidazole on multiple occasions. It has been observed that asymptomatic colonization actually can be protective against subsequent CDI. Treating these patients may not only abolish the protective effect but may also allow for a new, more virulent strain to be introduced^{1,2}. It is thus pertinent to take a good history, interpret lab results in an appropriate clinical context as well as consider other etiologies in patients presenting with diarrhea and C. difficile positive stools because the ramifications of our decisions can be harmful, wasteful and costly. 1. Shim, et al., Primary symptomless colonization by *Clostridium difficile* and decreased risk of subsequent diarrhea. *Lancet* 1998;351:633–6 2. Johnson S, et al. Treatment of asymptomatic *Clostridium difficile* carriers (fecal excretors) with vancomycin or metronidazole. A randomized, placebo-controlled

DISSEMINATED HERPES ZOSTER IN SOLID ORGAN TRANSPLANT (SOT) PATIENT PRESENTING WITH ABDOMINAL PAIN AND PULMONARY NODULES Jeremiah Stromich; Soumya Rangarajan; Dr. Mark Barash. Medical College of Wisconsin, Waukesha, WI. (Tracking ID #2198656)

LEARNING OBJECTIVE #1: Review Varicella Zoster Virus (VZV) clinical manifestations

LEARNING OBJECTIVE #2: Increase awareness and diagnostic challenge in disseminated VZV in immunocompromised patients

CASE: A 67 year old female with a past history of ESRD secondary to diabetic nephropathy status post renal transplant 7/2014, coronary artery disease, heart failure with preserved ejection fraction and irritable bowel syndrome presented with 1 week of severe cramping lower abdominal pain. Associated symptoms included nausea, emesis and fluctuating diarrhea and constipation. She also complained of increased dyspnea on exertion for the past 3–4 weeks, and her outside provider had increased her bumex dose for presumed heart failure exacerbation. On physical exam, the patient was in no apparent distress, but her lungs had bibasilar rales and a new 2 L O₂ requirement, her heart was regular rhythm with no murmurs, abdomen was tender to palpation diffusely but worse in both lower quadrants, and she had 1+ lower extremity edema. Labs were notable for slightly elevated creatinine and AST. A CT abdomen/pelvis without contrast ordered in the ED did not identify an etiology for the patient's abdominal pain, but did reveal numerous pulmonary nodules in both lower lung fields. A dedicated CT chest confirmed diffuse pulmonary nodules with surrounding ground glass halos in a random distribution. On the second day of hospitalization the patient complained of a pruritic rash that had been present for past week and was evaluated by dermatology on day three of hospitalization. The rash was scattered diffusely over her body including her labia, with numerous punched-out erosions with hemorrhagic crust, and intact vesicles with an erythematous base. Our differential was broad, including fungal infection, but dermatology confirmed these skin lesions were concerning for Herpes Simplex Virus or VZV. The vesicle was opened and biopsied, and was positive for VZV. On the 4th day of hospitalization, the

patient's O₂ requirements increased to 3 L, but the patient remained comfortable. However, in the early morning of hospital day #5, the patient suffered from cardiopulmonary arrest while ambulating to the restroom. The patient was resuscitated with ROSC and transferred to the medical intensive care unit. She suffered two more episodes of cardiac arrest and expired about 7 h after initial resuscitation. Preliminary autopsy report revealed hemorrhagic pneumonia with acute lung injury and viral cytopathic effect.

DISCUSSION: Here we report a case of disseminated VZV in a renal transplant patient who initially presented with abdominal pain, worsening dyspnea on exertion and a pruritic vesicular rash in numerous dermatomes positive for VZV. Initial infection with VZV usually begins in childhood, and by adulthood 90–95 % of Americans have been seroconverted. The primary infection, "chicken pox", is characterized by fever, malaise and a rash with maculopapules, vesicular and scabs in various stages diffusely over the trunk and extremities. Reactivation of the latent virus occurs later in life and is characterized by unilateral, dermatomal vesicular eruption with severe pain. Mortality is rare in the immunocompetent patient. However, in the immunocompromised, dissemination of reactivated VZV includes distribution over 3 or more dermatomes with visceral involvement. Visceral involvement carries significant mortality, up to 35 %, without anti-viral therapy. Visceral involvement in VZV can present as fever, abdominal pain, disseminated intravascular coagulation and hepatitis. Pulmonary involvement is described as interstitial pneumonitis with scattered necrotic and hemorrhagic foci with intranuclear inclusions on microscopy. Chest x-ray may demonstrate pulmonary nodules that will coalesce into extensive infiltrates bilaterally. Visceral involvement can occur prior to cutaneous involvement in immunocompromised patients, making clinical diagnosis a challenge in providers who do not have a high suspicion for VZV. Therefore, unexplained hepatitis, pancreatitis, complaints of abdominal pain or pulmonary nodules in immunocompromised patients should prompt a high degree of suspicion for VZV and empiric treatment with intravenous acyclovir while further diagnostic work-up is pursued.

DISSEMINATED MYCOBACTERIUM AVIUM-INTRACELLULAR INFECTION IN A PATIENT WITH ALCOHOLIC CIRRHOSIS David Ellenberg²; David Kudlowitz²; Joshua Cohen¹; James Park¹. ¹NYU, New York, NY; ²NYU, New York, NY. (Tracking ID #2179799)

LEARNING OBJECTIVE #1: Recognize the clinical features of *Mycobacterium avium-intracellulare* in patient without AIDS who is immunosuppressed from alcoholic cirrhosis.

CASE: A 27-year-old Mexican-born, homosexual male with a history of alcoholic cirrhosis and treatment-naïve latent tuberculosis presented to our hospital with diffuse abdominal pain and worsening distention for 5 days. The patient admitted to consuming one pint of vodka per day for the past 10 years. Six months prior to presentation at our institution, the patient presented to an outside hospital with a complaint of hematemesis and bright red blood per rectum. A subsequent colonoscopy revealed an ulcer at the transverse colon. Over the course of the next several months, he had several other hospitalizations for alcoholic hepatitis and pancreatitis. He denied prior episodes of ascites. On further review of systems at this latest presentation, the patient admitted to a 20-pound weight loss and productive cough with blood-tinged sputum over the preceding 2 months. He denied fevers, chills, and night sweats. Physical exam was notable for scleral icterus, lower extremity edema and a large amount of tense ascites. There was no asterixis, encephalopathy, or skin lesion. Labs were significant for AST 65, ALT 29, Alkaline Phosphatase 179, Total bilirubin 2.1 INR 1.6, and Creatinine 1.3. HIV ELISA and PCR were negative. Ascites was negative for bacterial peritonitis, but did demonstrate 10,000 red blood cells and 1828 nucleated cells (11 % neutrophils, 77 % lymphocytes). Imaging was notable for omental thickening with a subsequent biopsy of his omentum showing multiple caseating granulomas. Given the patient's history of a positive PPD and the biopsy findings, the patient was initially placed on isolation and treated for tuberculosis. His regimen included rifampin, isoniazid, pyrazinamide, and ethambutol. However, due to hepatotoxicity secondary to these antibiotics, treatment was held. The patient's ascitic fluid and sputum cultures subsequently grew *Mycobacterium intracellulare*. The patient was started on a 2-month long, liver-sparing regimen of moxifloxacin, ethambutol, azithromycin, and amikacin. A liver biopsy confirmed cirrhosis secondary to alcoholic injury with concomitant drug related hepatotoxicity (likely secondary to the initial tuberculosis antibiotics). The patient's condition stabilized on this regimen and he was discharged with close follow up.

DISCUSSION: *M. intracellulare* is one of the non-tuberculous mycobacteria that comprises the MAC organisms. Classically, it causes a localized pulmonary infection in immune-competent hosts, typically disseminating only in immune-compromised patients. While patients with underlying lung pathology have a significantly increased risk for developing a MAC infection, approximately half of cases are identified in patients without known lung disease. The infection is characterized by relatively non-specific URI symptoms, with almost all patients describing a productive cough, one-third of whom develop

hemoptysis. Constitutional symptoms including fevers, night sweats and weight loss occur in up to one-third of immune-competent patients. By contrast, disseminated MAC infections in patients with an immunodeficiency (such as AIDS) or with steroid-induced immunosuppression do not usually affect the lung. Constitutional symptoms, gastrointestinal involvement and infiltration of reticuloendothelial organs are more common. Risk factors include CD4 counts below 100, hypertriglyceridemia, interruption of HAART regimens, anemia and iron metabolism disturbances. Further, and similar to other mycobacterial infections, HIV replication is thought to be potentiated by MAC. Whether the host is immunocompetent or immunocompromised, diagnosis is secured with culture growth of the organism in a patient with an accompanying clinical picture suggestive of infection. Given the abundance of the organism in our environment, colonization alone is not enough to warrant treatment. Disseminated infections in patients who are not otherwise immunocompromised are rare. A review of the literature demonstrates five reported cases of disseminated MAC infections in patients with alcoholic cirrhosis, of which our patient had biopsy proven confirmation. Potential mechanisms increasing patients' susceptibility in this context are deactivation of T cells, which may be directly related to alcohol intake as opposed to liver dysfunction; further, cytokine inhibitor pentoxifylline, used to treat alcoholic hepatitis, has been shown to promote MAC in vitro. Decreased immunomodulating proteins in ascitic fluid, particularly complement, may also be implicated in the development of MAC peritonitis, characterized by a lymphocytic predominance in ascitic fluid, of which the patients described in the literature (and ours) showed evidence. Concomitantly, his alcoholic cirrhosis may independently increase his risk, as anecdotally evidenced by other cases seen in literature review.

DIVERTICULITIS POSING AS A "COMPLICATED" URINARY TRACT INFECTION Nathalie Regalado. UCSF, San Francisco, CA. (Tracking ID #2197668)

LEARNING OBJECTIVE #1: Recognize the atypical presentations of diverticulitis

LEARNING OBJECTIVE #2: Select the appropriate antibiotics for acute uncomplicated diverticulitis

CASE: An 81 year old man with well controlled human immunodeficiency virus (HIV) presented to the emergency room with acute onset chills and dysuria. Per medical records, he had been hospitalized 4 months prior with Klebsiella bacteremia and an Enterococcus urinary tract infection (UTI). He recovered having had completed a total of 14 days of antibiotics with ceftriaxone and then cephalexin. At the current presentation, he had burning with urination, which was much worse than on his prior admission. He endorsed mild abdominal discomfort and loose stools for 2 days, which he attributed to taking laxatives. His past medical history included HIV (CD4 count 454 cells/mm3 with an undetectable viral load 4 months prior), stage IIb chronic kidney disease, indirect hyperbilirubinemia likely secondary to protease inhibitors and hypertension. His medications included Metoprolol 25 mg twice daily, Emtricitabine 200 mg/Tenofovir 300 mg daily, Atazanavir 300 mg daily, and Ritonavir 100 mg daily. He had allergies to sulfa, penicillin and levofloxacin. He was not sexually active but used to have sex with men. He never smoked, used alcohol in excess or any illicit drugs. His temperature was 102 F, pulse 83 beats per minute, blood pressure 145/75 mmHg, respiratory rate 24 breaths per minute and O2 sat 96 % on room air. He was in no acute distress. Bowel sounds were normal, and there was no abdominal distension or organomegaly. He was tender to deep palpation in the suprapubic area with no rebound or guarding. There was no costo-vertebral angle tenderness. His prostate was mildly enlarged and nontender. His white blood cell count was $10.9 \times 10^3/\mu\text{L}$, serum creatinine 1.4 mg/dL (baseline) and bilirubin 3.3 mg/dL (baseline). His urinalysis (UA) had trace leukocyte esterase, trace bacteria and <2 WBC/HPF. He was started on ceftriaxone for presumed urosepsis given weekly positive UA, suprapubic tenderness, dysuria and recent UTI. Given his advanced age, co-morbidity with HIV, known bilirubinemia, prior Klebsiella bacteremia and enterococcus UTI, and now a suspected recurrent UTI, a non-contrast abdomen/pelvis CT was obtained to gather more information. This showed diverticulitis of the sigmoid colon with modest inflammation of the adjacent bladder. Patient then recalled a previous episode of diverticulitis at age 60, where he presented with left lower quadrant pain and tolerated metronidazole poorly. He was started on moxifloxacin 400 mg daily for 10 days, which lead to symptom resolution. His urine culture grew <1000 colonies of enterococcus species and his blood cultures were negative.

DISCUSSION: In this case, an HIV positive elderly man with dysuria and vague abdominal symptoms was found to have acute uncomplicated diverticulitis. As tends to be the case with other intra-abdominal processes, diverticulitis is more likely to present with atypical symptoms in elderly patients. Our patient did not have the classic left lower quadrant pain that could be expected with sigmoid diverticulitis. However, there is extensive literature to support including diverticulitis in the differential diagnoses for patients presenting with concomitant abdominal and lower urinary tract symptoms, regardless of age. Close anatomical proximity to the inflamed colon can lead to bladder irritation in men (or women who have had a hysterectomy). Subsequently, patients can develop dysuria, frequency and sterile pyuria. In his case, the enterococcus bacteriuria was

probably not a true infection, but his symptoms were difficult to interpret before the diagnosis of diverticulitis was known. Referred pain via the sacral plexus can also present with pain affecting the suprapubic area, the groin, the scrotum or the penis. Once diverticulitis is complicated by fistula formation, symptoms can also include pneumaturia, fecaluria or true UTIs. Before the realization that genitourinary symptoms can present in up to 35 % of patients with diverticulitis, we had questioned the relevance of this patient's HIV status. Review of the literature did not reveal data to suggest that patients with HIV and diverticulitis present any different or that they are more likely to suffer complications. In general, diverticulitis is caused by a bacterial infection with gram negative rods (GNRs) or anaerobes (or a combination). Since this patient had an allergy to levofloxacin and tolerated metronidazole poorly in the past, he was not a candidate for ciprofloxacin plus metronidazole (a typical regimen for uncomplicated diverticulitis). There are other recommended antibiotic regimens, but the literature does not support one regimen over another. Given this, moxifloxacin was chosen since it covers both GNRs and anaerobes, leading to a full recovery in this patient.

DOC, MY HEART IS IN MY STOMACH Rachel Vanderberg¹; Jen Rusiecki²; Deborah DiNardo³. ¹UPMC, Pittsburgh, PA; ²University of Pittsburgh, Pittsburgh, PA; ³University of Pittsburgh School of Medicine, Pittsburgh, PA. (Tracking ID #2196765)

LEARNING OBJECTIVE #1: Recognize the role of physical exam (PE) in evaluating asymptomatic abdominal aortic aneurysm (AAA)

LEARNING OBJECTIVE #2: Manage a patient with an asymptomatic AAA

CASE: A 65 year old male with diabetes mellitus type II, hyperlipidemia, and a 50 pack year smoking history presented to primary care clinic with a complaint of a palpable abdominal pulse in the setting of a recent intentional 15 lb weight loss. Exam revealed a periumbilical pulsatile mass approximately 7 cm in diameter. Abdominal ultrasound (US) revealed a 5.9 cm aneurysmal dilation of the infrarenal abdominal aorta. The patient was immediately referred to vascular surgery. CTA demonstrated a fusiform infrarenal abdominal aortic aneurysm 5.6 cm transverse. The patient is currently scheduled for endovascular repair.

DISCUSSION: The estimated prevalence of AAA among men aged 65 to 79 years is 5–10 %. Approximately 12,000–15,000 patients/year in the U.S. will suffer a ruptured AAA. AAA screening has been demonstrated to reduce AAA related mortality making it an important aspect of preventative care. The primary care physician should understand the role of physical exam in diagnosing an AAA, identify appropriate patients for AAA screening, and manage patients with known asymptomatic AAAs. Asymptomatic AAAs include unruptured AAAs found on imaging or exam. The United States Preventive Services Task Force (USPSTF) recommends that men ages 65 to 75 who have ever smoked should have a onetime AAA screening with US (Grade B).¹ Some experts recommend yearly AAA screening through focused PE in all men older than 60; however, this recommendation is not shared by many other organizations.² A meta-analysis of 15 studies assessing PE as a screening method for AAA found the sensitivity varied by the size of the AAA (29 %, 50 %, and 76 % for AAAs 3.0–3.9, 4.0–4.9, and ≥ 5.0 cm, respectively).³ Another study demonstrated the sensitivity of PE to range from 61 % for AAAs 3.0–3.9 cm to 82 % for AAAs ≥ 5.0 cm.⁴ The overall specificity was 75 %. Sensitivity also increased with decreasing abdominal girth (91 v. 53 % for abdominal girth <100 cm and >100 cm, respectively). Another study evaluating the accuracy of self exam found a range of sensitivities from 50 % for AAAs <4 cm to 93 % for AAAs >5 cm with an overall specificity of 69 %.⁵ The data suggests the examiner is unlikely to miss AAAs large enough to require surgery. PE should be interpreted with caution in obese patients and should not replace US. Patient reports of pulsatile abdominal masses should raise clinical suspicion for AAA. Additionally, self-examination or PE may be a potential screening method in populations not routinely offered US screening. Elective repair is recommended for all patients who are fit for surgery with an asymptomatic AAA ≥ 5.5 cm. The risk of rupture increases dramatically and the risk of rupture outweighs the risk of surgery in patients with an AAA ≥ 5.5 cm. Other factors including female gender, younger age, rapid expansion (>5 mm/6 months or >10 mm/year), and coexistent aneurysms or peripheral artery disease in patients with an asymptomatic AAA <5.5 cm may influence the decision of elective repair and should prompt referral to vascular surgery. Otherwise, tobacco cessation counseling and periodic US surveillance are appropriate for patients with an asymptomatic AAA <5.5 cm. Optimal US screening intervals are still being investigated. The 2009 Society for Vascular Surgery guidelines recommend abdominal US every 5 years, 3 years, 12 months, and 6 months for AAAs 2.6–2.9, 3–3.4, 3.5–4.4, and 4.5–5.4 cm as the rate of expansion increases with increasing aneurysm size.⁶ Current tobacco use is the only known modifiable risk factor for AAA expansion rate. Treatment with beta blockers, angiotensin receptor blockers/angiotensin converting enzyme inhibitors, diuretics, calcium channel blockers, statins, antibiotics, anti-platelet agents, and anti-inflammatory agents have not been consistently shown to decrease AAA expansion rate. References 1. Clinical Summary: Abdominal Aortic Aneurysm: Screening. U.S. Preventive Services Task Force. October 2014. <http://www.uspreventiveservicestaskforce.org/>

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DON'T FALL FOR IT: A CAREFUL HISTORY AND PHYSICAL REVEALING SUPERIOR VENA CAVA SYNDROME (SVC) MAY BE CRUCIAL IN EARLY DETECTION OF SMALL CELL LUNG CANCER (SCLC) Daniel S. Zhang. Baylor College of Medicine, Houston, TX. (Tracking ID #2199519)

LEARNING OBJECTIVE #1: Recognize that isolated SVC syndrome may be the initial presentation of SCLC in particular

LEARNING OBJECTIVE #2: Early diagnoses and detection of SCLC through a detailed history and physical results in improved cure rates

CASE: A 68 year old black male with a history of colorectal cancer cured with resection and chemotherapy, along with extensive tobacco use was admitted with worsening right shoulder pain and neck swelling after an accidental fall from a ladder 3 days prior to presentation. Upon further questioning, patient revealed that these symptoms were actually present prior to the fall, but denied any history of cough, dyspnea or hematemesis. A right shoulder x ray was unremarkable, however his physical exam was noticeable for impressive distention of his neck veins bilaterally as well as facial plethora concerning for SVC syndrome. Initial CXR showed a 3 cm right lung mass, which upon further imaging with PET-CT revealed extensive invasion into mediastinal lymph nodes and compression of the SVC, without further evidence of metastasis. A biopsy was performed that same day which was consistent with SCLC. The patient underwent emergent chemotherapy with radiation therapy with curative intent.

DISCUSSION: Superior vena cava syndrome usually occurs as a result of compression of the vessel from an external mass. Initial physical presentation may be subtle including mild facial fullness, hoarseness, dysphagia before advancing to more classic signs including dyspnea and venous distention of neck and chest wall. This is an important physical finding since an estimated 80 % of the time the cause is a malignant tumor involving mediastinal lymph nodes. SCLC comprises the majority of these tumors given its central lung location and tendency for rapid growth into adjacent lymph nodes. In the event SVC syndrome is diagnosed, further workup must be pursued, typically with additional imaging and biopsy of the mass causing compression. In this instance, elucidating a concise and accurate history and physical was vital for this patient. Our case emphasizes the importance of recognizing a pathological physical exam finding that could have easily been incorrectly attributed to an unrelated event. Because of the early detection of malignancy in this patient, it was classified as limited stage SCLC, which has a median survival twice as long with treatment compared to extensive stage SCLC, with four to five times greater survival rates at 5 years.

DON'T UNDERESTIMATE IRON OVERLOAD Merrill H. Stewart. Tulane University School of Medicine, New Orleans, LA. (Tracking ID #2199872)

LEARNING OBJECTIVE #1: Appreciate the pathophysiology of iron overload and recognize how this relates to its key clinical characteristics

LEARNING OBJECTIVE #2: Realize the diverse etiologies of iron overload in addition to hereditary hemochromatosis

CASE: A 57 year-old man presented with 3 weeks of shortness of breath and palpitations. He also reported several months of polyuria and polydipsia. His history was remarkable for a microcytic anemia and hepatitis C with cirrhosis. He was afebrile, tachycardic, and in slight respiratory distress. He had an irregularly irregular pulse and bilateral lung rales. Skin exam revealed diffuse bronze pigmentation. His blood glucose was 282 mg/dL, hemoglobin 7.1 gm/dL, mean corpuscular volume 69 fL, and a peripheral smear displayed target cells. Atrial fibrillation with rapid ventricular response was delineated on the electrocardiogram, and a depressed ejection fraction of 35 % was seen on the echocardiogram. No ischemia was found on a nuclear stress test. Serum iron was 171 mcg/dL, transferrin saturation 95 %, and ferritin 1268 ng/mL. A gene analysis showed a heterozygous H63D hemochromatosis mutation and a hemoglobin electrophoresis was run with 95 % hemoglobin A1 and 5 % hemoglobin A2.

DISCUSSION: Iron is found in the body in red blood cells, attached to transferrin circulating in the serum, and stored as ferritin in the bone marrow and liver. In iron

overload conditions as the total body iron content increases, the production of ferritin increases and the transferrin protein becomes saturated. It is this saturation that causes iron to spill over and form complexes with other plasma components such as albumin, complexes collectively called Non-Transferrin Bound Iron (NTBI). Only those cells that have mechanisms to do so take up the NTBI: mainly the heart, liver, and endocrine cells. Once inside the cell, the iron catalyzes reactions to form reactive oxygen species that result in tissue damage. The clinical effects are related directly to the NTBI accepting organs and can include any of the following: hepatitis, cardiomyopathy, diabetes mellitus, hypogonadism, hypothyroidism, arthropathy, and bronzed skin. Individually these are common diseases, however in constellation in the right clinical picture they can suggest a diagnosis of iron overload. Our patient has a history of hepatitis C with cirrhosis, but in the last several months has developed new conditions such as bronzed skin, congestive heart failure, and diabetes mellitus. An elevated ferritin >500–1000 ng/mL is suggestive of an iron overload condition however non-specific, and an elevated transferrin saturation >60 % is more specific but still does not specify an etiology. Most internists are familiar with hereditary hemochromatosis as the prototypical iron overload syndrome, however other conditions can present similarly. Excretion of iron is minimal and fixed through skin, sweat, and menses at 1–2 mg/day, so most overload is the result of inappropriate addition of iron. The addition can be from parenteral infusions, red blood cell transfusions, massive iron consumption, or increased absorption of normal dietary iron. Parenteral iron (such as for those undergoing hemodialysis) or iron containing products (such as hematin for patients with porphyria) present an obvious risk of iron overload. Regular transfusions for chronic anemias also pose a risk. Both of these groups should have regular monitoring, and over time may require chelation therapy. Massive ingestion of enteral iron is rare, and only known to exist in some African countries where large quantities of beer are consumed that have been brewed in iron containing canisters. Finally increased absorption of normal dietary iron is more common but less understood. This group shares a common pathway through the down regulation of the iron controlling protein hepcidin. Various causes of ineffective erythropoiesis such as sideroblastic anemia, thalassemias, and myelodysplastic syndromes all lead to a down-regulation of hepcidin which in turn increases intestinal absorption of iron. In our patient we see he is only heterozygous for the hemochromatosis mutation, an autosomal recessive condition. He has no risk factors of chronic transfusion or ingestion, however we also see microcytosis, target cells, and elevated hemoglobin A2 percentage. These together suggest a possible diagnosis of beta thalassemia trait driving an inappropriate absorption of iron leading to an iron overload state. Iron overload is not a difficult diagnosis to make once the clinical signs and symptoms are understood. However once the diagnosis is made, careful consideration must be taken to determine the exact etiology of the disease.

DRESSLER-LIKE SYNDROME Venkatesh Alapati; Radeyah Hack; Irida Balili. Montefiore Medical Center, Bronx, NY. (Tracking ID #2199677)

LEARNING OBJECTIVE #1: Identify acute pericarditis as a rare complication of pulmonary embolism and infarction

LEARNING OBJECTIVE #2: Identify clinical signs and treatment for acute pericarditis

CASE: A 26 year old woman with history of systemic lupus erythematosus (SLE) and pulmonary emboli (PE) initially presented with chest pain and hemoptysis. She was tachycardic and tachypneic. She was found to have acute left lower lobe pulmonary embolism and infarction on CT Angiogram, and was started on heparin infusion. Four days into her hospital stay, she became febrile and developed intense chest pain. She was tachycardic and a new friction rub was present. Her C4 and C3 complements and troponins were within normal limits. Electrocardiogram showed new diffuse ST elevations in all leads which were not present at admission. Her echocardiogram showed moderate plural effusion. There was no evidence of cardiac tamponade. Patient had no symptoms suggestive of a lupus flare. She was treated with ibuprofen, colchicine and prednisone. Her symptoms resolved, and she was discharged home. Her pericarditis was unlikely to be secondary to lupus as patient had normal complements and no other clinical signs of a lupus flare. She was thought to have Dressler's-like syndrome, in which acute pericarditis occurs after 5–15 days after pulmonary embolism and infarction, usually in left lower lobe.

DISCUSSION: Acute pericarditis presents with chest pain, pericardial friction rub, typical electrocardiographic changes and pericardial effusion. Two of the previous four symptoms are required to make a diagnosis. About 80–90 % of cases are thought to be secondary to viral infections. The remaining cases are thought to be associated with post-cardiac injury syndromes, connective-tissue diseases or cancer. Nonsteroidal anti-inflammatory drugs (NSAIDs) have long been the mainstay of initial treatment of acute pericarditis. Most common agents are ibuprofen, indomethacin and aspirin. Recent evidence has shown addition of colchicine reduces persistent or recurrent pericarditis. Patients with cardiac tamponade should undergo urgent therapeutic pericardiocentesis. Pericarditis after myocardial infarction (Dressler's syndrome) has been well described. A similar syndrome of pericarditis after pulmonary embolism has been described in the

literature. Symptoms occur usually five to fifteen days after PE and infarction. Left lower lobe of the lung seems to be most common site of PE and infarction. Most patients clinically improve when treated with NSAIDs and steroids. The patho-physiology is not clear, but it is thought that anatomic vicinity of PE and pericardium and possible hypersensitivity induced by the infarction might play a role.

DRUG REACTION DRESSED UP AS SEVERE SEPSIS Rekha Kambhampati; Ahmed Khan; Manish Patel. Rutgers-Robert Wood Johnson Medical School, North Brunswick, NJ. (Tracking ID #2200034)

LEARNING OBJECTIVE #1: Recognize that the presenting signs and symptoms of DRESS syndrome can mimic severe sepsis.

LEARNING OBJECTIVE #2: Recognize that DRESS syndrome can occur despite appropriate dose escalation of antiepileptics.

CASE: The patient was a 21-year-old female with borderline personality disorder who had initiated lamotrigine 25 mg daily six weeks prior to admission and was appropriately titrated up to 50 mg daily three weeks later. She began to have high-grade fevers up to 105 °F with myalgias and fatigue ten days prior to admission and subsequently developed an extensive rash across her face and body. On admission, the patient was found to have a temperature of 103.3 °F and a blood pressure of 67/44. Physical exam revealed a confluent, morbilliform, and erythematous rash with desquamation affecting her face, torso, back, and all extremities, as well as cervical and inguinal lymphadenopathy. Initial laboratory findings included a white blood cell count of 23,200 with 13 % eosinophils, AST 818, ALT 670, and alkaline phosphatase 208. She had voluntarily discontinued her lamotrigine on onset of symptoms and it was not restarted on admission. Given the concern for severe sepsis, the patient was volume resuscitated and started on broad-spectrum antibiotics. However, blood and urine cultures were negative and blood pressure improved after fluid administration. Antibiotics were promptly discontinued after a diagnosis of drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome was made based on the RegiSCAR diagnostic criteria. Further extensive infectious work-up revealed negative viral hepatitis serologies, HIV, Epstein Barr Virus IgM, RPR, influenza A and B, HHV-6, parvovirus B19, and HSV 1 and 2. Thyroid function tests and ANA were also within normal limits. The patient was evaluated by dermatology and prescribed hydrocortisone topical cream. However, given worsening liver function tests and persistent symptoms, the patient was started on prednisone 1 mg/kg/day, resulting in dramatic improvement in liver function abnormalities to AST 65, ALT 308, and alkaline phosphatase 168. At the same time, her rash improved with near complete resolution.

DISCUSSION: DRESS is a rare and possibly deadly syndrome that has been estimated to occur in 1 in 1000 to 1 in 10,000 exposures to many commonly prescribed medications, including antiepileptics, sulfonamides, and allopurinol. Mortality has been reported to be up to 10 %, most commonly in severe hepatic involvement, which was of concern with our patient given her significant transaminitis. We present an unusual case of DRESS syndrome which highlights several important issues in clinical practice. The diagnosis of DRESS can be made using the RegiSCAR scoring system, which requires hospitalization for acute rash in the setting of a medication associated with the syndrome, with at least three of the following additional features: (1) fever greater than 38 °C, (2) lymphadenopathy in two or more locations, (3) involvement of one or more visceral organs, and (4) hematologic abnormalities, including leukocytosis or leukopenia, elevated eosinophils, and/or thrombocytopenia. Hypotension is not commonly seen in DRESS syndrome and, consequently, this patient's case appeared to represent severe sepsis on admission despite her meeting the RegiSCAR diagnostic criteria. It is thus important for clinicians to know that DRESS syndrome can masquerade as severe sepsis and to be able to recognize when it does so, as treatment regimens vary greatly between the two. Furthermore, lamotrigine has been established as a cause of DRESS syndrome when it is initiated at high doses or when it is titrated up in sooner than two week intervals. However, our patient developed DRESS syndrome despite correct prescribing practices, as her dose was started at the lowest available amount and increased at the appropriate time. This case emphasizes that the prompt diagnosis and treatment of DRESS syndrome relies on the appropriate index of suspicion in the correct clinical setting, even with uncommon presentations of DRESS syndrome.

DRUG-INDUCED PSORIATIC ARTHRITIS—RARE PRESENTATION AFTER HEPATITIS C TREATMENT Dilpreet K. Singh; Jasdeep S. Badwal; Dominic Demello. Baystate Medical Center/Tufts School of Medicine, Springfield, MA. (Tracking ID #2192195)

LEARNING OBJECTIVE #1: Recognize possible rare side effect of hepatitis C treatment.

LEARNING OBJECTIVE #2: Management of psoriatic arthritis in the setting of chronic hepatitis C.

CASE: A 52 year old Hispanic male with medical history significant for Hepatitis C, genotype 1a, in the setting of IV drug abuse presented for a rheumatology consultation with a complaint of swelling and warmth of several digits, plaques of psoriasis on both knees, darkened nails with pitting, and morning stiffness lasting one hour. Three months prior, he had completed treatment for hepatitis C with triple therapy consisting of sofosbuvir, ribavirin and peginterferon alfa 2b with undetected viral load. He denied a history of similar symptoms prior to initiating hepatitis C therapy, and denied a personal or family history of skin or rheumatological diseases. On presentation, his vitals were stable. Physical exam was significant for scaly red patches over both knees, finger nail pitting, mild pain on flexion of his wrists, fusiform swelling and warmth of both thumbs and the first two fingers, mild dactylitis in his feet and crepitus in both knees. With the onset of dactylitis, psoriasiform rash and arthralgia after Hepatitis C treatment, a diagnosis of psoriatic arthritis was suspected. A short course of prednisone and naproxen was commenced. Laboratory testing revealed an elevated CRP, elevated ESR, normal liver function tests and renal function tests, elevated rheumatoid factor and normal anti-CCP. On follow-up visit, the patients' swelling, arthralgia, dark nail color and scaly knee rash markedly improved. However, he had persistent swelling of the distal phalangeal joints bilaterally, pitting of the nails, and scaly salmon color rash on his knees. He was then started on methotrexate and folic acid for treatment of psoriatic arthritis.

DISCUSSION: Interferon alpha induced psoriatic arthritis is rare, cited as case reports in the literature, being more common from interferon alpha as monotherapy or in combination with ribavirin (1, 2). We report the first case of psoriatic arthritis induced in a patient with hepatitis C treated with triple therapy with sofosbuvir, ribavirin, and peginterferon alfa 2b. As psoriatic arthritis is a T-cell mediated disease with a strong cytokine component, the likely mechanism is mediated by the release of interferon alpha induced cytokines through a T-cell response. Interferon alpha induces the production of interleukins (IL-12 and IL-23), with resultant proliferation of T helper (TH-1 and TH-17) cells. TH-17 produces IL-17 that induces the production of pro-inflammatory cytokines. This mechanism is supported given the presence of high levels of IL-17, IL-12, and TH1 in the synovium of people with psoriatic arthritis (3). Cases of interferon-induced psoriasis have shown to improve with cessation of interferon alpha (1). In cases where symptoms and clinical exam for synovitis and psoriasis do not resolve, such as in our case, it is important to consider the possibility of hepatotoxicity associated with the use of conventional agents (disease modifying anti-rheumatic drugs) used to treat psoriatic arthritis in the setting of hepatitis C, prior to initiating therapy. In our case, the initial exacerbation had some improvement with a course of prednisone. His hepatic function was determined to be normal for which treatment with methotrexate and folic acid was then initiated. Psoriatic arthritis has also been successfully treated with biologics such as etanercept in hepatitis C patients (4). This case highlights the need for physicians to recognize the rare adverse effect of interferon alpha induced psoriatic arthritis in a patient being treated for chronic hepatitis C with interferon alpha. Management involves using conventional agents for psoriatic arthritis with special risk consideration for hepatotoxicity in the setting of hepatitis C. **References:** 1. Taylor C et al. Extensive psoriasis induced by interferon alfa treatment for chronic hepatitis C. *Postgrad Med J* 2000; 76:365–366. 2. Citro V. et al. Extensive psoriasis induced by pegylated interferon: a case report. *Journal of Medical Case Reports* 2007; 1 (86): 1–4. 3. Lloyd P et al. Psoriatic Arthritis: An Update. *Arthritis* 2012;1–6. 4. Mederacke I et al. Successful clearance of hepatitis C virus with pegylated interferon α -2a and ribavirin in an etanercept-treated patient with psoriatic arthritis, hepatitis B virus coinfection and latent tuberculosis. *Ann Rheum Dis* 2011; 70(7):1343–1344.

ELDERLY MAN WITH GENERALIZED WEAKNESS Dima Dandachi; Chandramohan Meenakshisundaram. Saint Francis Hospital, Evanston, IL. (Tracking ID #2199375)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of Endocarditis due to L. monocytogenes that can present insidiously with non-specific symptoms as weakness, dyspnea, and cardiac murmur and causes significant morbidity and mortality.

LEARNING OBJECTIVE #2: Treat Listeria endocarditis with appropriate antibiotic therapy taking into consideration reported resistance and reserve surgical options to resistant cases,

CASE: Eighty-five year old man presented to our Emergency Department after he sustained a mechanical fall and injury to his left forehead. Patient denied any lightheadedness, palpitations or headache before the fall. He denied loss of consciousness and he was able to ambulate after, with the help of his wife. His review of system was positive for progressive generalized weakness of 2 weeks duration and loss of appetite. His past medical history was significant for Hypertension, coronary artery disease, coronary artery bypass grafting, aortic stenosis, bioprosthetic aortic valve replacement, atrial fibrillation, chronic kidney disease (CKD) stage III. His medications included Amiodarone, Metoprolol and Apixaban. At that time, the patient was afebrile, and he was hemodynamically stable. On physical examination he had ecchymosis over the left orbit but no

obvious scalp injuries and grade 2/6 ejection systolic murmur at the apex, there were no abnormal neurological findings and the rest of his physical exam was unremarkable. Initial workup revealed anemia with hemoglobin of 8.4 (Baseline 11 g/dl), normal WBC count. Urinalysis was positive for leucocytes and nitrite. CT Brain revealed hemorrhagic contusion over the Left frontal region with no mass effect. CT Cervical spine was negative for fracture. Patient was admitted for observation and Apixaban was held and ciprofloxacin was started for possible urinary tract infection after blood cultures has been collected. On second day of his admission, 1 blood culture grew gram positive rods later identified as *Listeria* (L.) monocytogenes. Repeated blood cultures grew L. monocytogenes sensitive to ampicillin (minimum inhibitory concentration MIC 0.06 ($\mu\text{g/mL}$)) and trimethoprim (MIC 0.25 ($\mu\text{g/mL}$)). Subsequently, trans-thoracic echocardiogram and trans-esophageal echocardiograms revealed the bioprosthetic aortic valve riddled with vegetations, Ejection fraction was decreased to 55 % and aortic incompetence was increased compared to echocardiogram done 2 years earlier. No abscess or fistula of the perivalvular annular region were detected. According to modified Duke's criteria, we diagnosed the patient with infective endocarditis caused by L. monocytogenes and antibiotic treatment was initiated with Ampicillin IV 2 g Q 8 h adjusted for his CKD. Gentamycin was not added because of his underlying kidney disease. Surgery was not considered given his co-morbid conditions. After 3 days of antibiotics, blood cultures were negative, patient remained afebrile. His hospital course was complicated by acute kidney injury, acute respiratory failure secondary to fluid overload. Later during his admission, patient was enrolled in hospice based on his wishes and he went home after that under hospice care.

DISCUSSION: L. monocytogenes is a gram positive coccobacillus that has aerobic and facultatively anaerobic characteristics. *Listeria* infection is an important public health problem in the United States and has been associated with several outbreaks. It is a food borne illness transmitted by consumption of contaminated food such as uncooked meats or vegetables, unpasteurized milk and cheeses. The clinical manifestations can be self-limited gastrointestinal tract illness in immunocompetent patients or can cause serious morbidity and mortality mainly in pregnant women, elderly individuals, and immunocompromised patients. The most serious presentation being bacteremia and meningitis. Endocarditis secondary to *Listeria* is rare and has been reported mostly in patients with underlying cardiac valve disease. There has been no available clear guidelines regarding management of *Listeria* endocarditis. The evidence behind choice of antibiotics is not clear. -Ampicillin is generally considered the preferred agent however -its superiority to Penicillin is questionable. Course of antibiotics should be for at least 4 weeks for native valve endocarditis and for 6–8 weeks for prosthetic valve infections. On the basis of synergy observed in vitro and in animal models the combination of ampicillin with aminoglycosides, usually gentamycin, has been used for serious infections. Moreover, surgical treatment has been controversial, available data did not show any significant difference in mortality between surgical and non-surgical treatment. Surgery has been reserved for cases that are resistant to eradication with antibiotics. We report a case of *Listeria* endocarditis in an elderly men presenting with non-specific symptoms which makes early diagnosis challenging. We were able to reach microbiological cure with Ampicillin treatment without surgical treatment.

ENCAPSULATING PERITONEAL SCLEROSIS Abdel Rahman A. Omer; Omar Nadhem; Nibras Talibmamury; Mohammed A. Bahaa Aldeen; Roger D. Smalligan; Mashrafi Ahmed. Texas Tech University Health Sciences Center, Amarillo, TX. (Tracking ID #2198214)

LEARNING OBJECTIVE #1: Recognize the diagnostic approach and pathophysiology of encapsulating peritoneal sclerosis.

LEARNING OBJECTIVE #2: Focus on the importance of early diagnosis and management of encapsulating peritoneal sclerosis.

CASE: A 49 years old male presented with abdominal pain for 7 days. The abdominal pain was mainly in the epigastric region, and occasionally diffuse around the umbilicus. It was intermittent, but became more constant with increased severity over period of time. He graded it as 8/10 in intensity. The pain was aggravated to a certain extent by food, and relieved only by pain medications. It did not radiate to the back. The patient denied complains of fever, nausea, vomiting, constipation and diarrhea. His past medical history was significant for hypertension, type 2 DM, end stage renal disease, on hemodialysis 3 times a week. He was recently switched to hemodialysis from peritoneal dialysis due to recurring episodes of peritonitis, hyperlipidemia and peripheral vascular disease. In the past, he was admitted on three occasions with peritonitis. The patient also had bilateral lower limb amputation secondary to his PVD and diabetes. On physical exam his vitals were within normal limits, and oxygen saturation was 99 % in room air. He was alert and oriented. Abdominal exam revealed a distended and tense abdomen with slight rigidity. There was guarding on percussion and presence of ascetic fluid was noted. Bowel sounds were diminished. No organomegaly was appreciated due to the fluid. A CT angiogram with a CT scan of the abdomen revealed extensive calcification without any evidence of mesenteric ischemia. Esophagogastroduodenoscopy showed gastric antral thickening.

Finally an exploratory laparoscopy with peritoneal biopsies was done and visualization showed extensive areas of fibrosis and sclerosis in the peritoneum. Biopsy results were consistent with encapsulating peritoneal sclerosis. After the diagnosis of encapsulating peritoneal sclerosis (EPS), the patient was started on 40 mg Prednisone orally. He continued with his hemodialysis 3 times per week. Eight days after admission the patient was discharged in a stable condition. The abdominal pain was under control when the patient was discharged.

DISCUSSION: The case illustrated above explains the potential of developing encapsulating peritoneal sclerosis after long duration of ambulatory peritoneal dialysis. It is believed that the continuous exposure of the peritoneum to the bio-incompatible peritoneal dialysis compounds is the cause behind the progressive peritoneal membrane damage. Recent data also stated that the disease was observed more frequently after discontinuation of the peritoneal dialysis and conversion to hemodialysis, which is also observed in the above case. It is also suggested that persistent and recurrent episodes of peritonitis strongly contribute to the development of this disease; this is perhaps due to the inflammatory response that the peritonitis imposes on an already damaged peritoneum. Early recognition of Encapsulating Peritoneal Sclerosis and its association with peritoneal dialysis is important in preventing common surgical emergencies that can develop. The use of the newer generation of the more biocompatible peritoneal dialysis fluids that are low in glucose degradation products might be promising, but long term study results are still lacking.

EPIPERICARDIAL FAT NECROSIS: AN UNUSUAL AND UNDER-DIAGNOSED CAUSE OF CHEST PAIN Jacob E. Berchuck¹; Shalini Patel². ¹UCSF Medical Center, San Francisco, CA; ²UCSF/San Francisco VA, San Francisco, CA. (Tracking ID #2199499)

LEARNING OBJECTIVE #1: Recognize epipericardial fat necrosis (EPFN) as an uncommon, but benign clinical entity that mimics more serious causes of chest pain

LEARNING OBJECTIVE #2: Learn the diagnostic work-up and management of EPFN

CASE: An 80 year-old man with history of coronary artery disease requiring PCI, heart failure with preserved EF, hypertension, chronic tobacco use, COPD, provoked DVT 2 years earlier treated with 6 months of oral anticoagulation, untreated latent TB, and Barrett's esophagus, was admitted from the emergency room for left-sided chest pain and hypoxia. The pain had been present intermittently for 6 months, was located both anteriorly and posteriorly, described as stabbing, and worse with inspiration. In the preceding 6 months, he presented to multiple hospitals with the same complaint and was treated for pneumonia once, COPD exacerbation multiple times, and underwent thoracentesis for a left-sided pleural effusion. These interventions resulted in transient improvement, but the chest pain continued to recur. Physical exam was notable for an oxygen saturation of 85 %, bibasilar rales, asymmetric lower extremity swelling, normal cardiac exam, no chest wall tenderness or rash, and no expiratory wheeze. Initial labs revealed a normal leukocyte count, stable mild anemia, normal renal function, and negative troponin. ECG was normal sinus rhythm and otherwise unremarkable. Chest CT with contrast showed no evidence of pulmonary embolism, pneumonia, empyema, pneumothorax, tuberculosis, or chest injury, but demonstrated a small left-sided pleural effusion and new diffuse inflammatory changes within the epipericardial fat of the left mediastinum with prominent stranding and swirling soft tissue density extending to the pericardial surface with mild inflammatory changes of the pericardium. During the admission tuberculosis was ruled out with negative AFB smears and cultures. The patient was treated with diuretics for decompensated heart failure with resolution of hypoxia, but the chest pain persisted. Both the radiologists and pulmonary consultants felt that in the absence of a compelling alternative diagnosis, the chest pain and radiographic findings were consistent with pleurisy due to EPFN. Ibuprofen was started prior to discharge. At 3-month follow-up the patient reported resolution of chest pain after 2 months without recurrence of symptoms. Repeat CT showed no pleural effusion and near complete resolution of epipericardial fat stranding.

DISCUSSION: Recent studies indicate that although uncommon, EPFN is not as rare as previously thought, and is under-diagnosed in patients with acute chest pain and an otherwise negative cardiopulmonary work-up. In most instances the onset is acute, but as in this patient, pain can persist for up to a year. Chest pain is usually ipsilateral to the lesion, which is more commonly on the left than right side. The pain is often intermittent and worsens with movement and deep inspiration. A history of trauma or infection is usually absent. ECG, cardiac enzymes, leukocyte count, and other lab tests are usually normal. Chest radiography often shows a paracardiac opacity, occurring predominantly on the left side, occasionally with an associated pleural effusion. On CT scan EPFN appears as an ovoid mediastinal fatty lesion with epipericardial fat stranding with or without adjacent pericardial thickening. Until recently, definitive diagnosis required surgical resection and pathologic examination given radiographic resemblance to other fat containing mediastinal lesions, including liposarcoma. With advances in imaging, however, these classic radiographic findings, in the setting of acute pleuritic chest pain and a

negative cardiopulmonary work-up, are highly suggestive of EPFN. Because of its benign, self-limited nature, conservative management with anti-inflammatories is recommended. Repeat CT scan should also be obtained to confirm resolution of the radiographic inflammatory changes associated with EPFN and to rule out neoplastic disease. Both radiologists and clinicians should be aware of the clinical presentation of this benign condition and should include it in their differential diagnosis of chest pain once other more serious etiologies have been ruled out.

EPITHELIOID ANGIOSARCOMA PRESENTING AS SHOULDER PAIN Akash

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LEARNING OBJECTIVE #1: Recognize that common primary care complaints may be caused by serious and uncommon underlying pathology.

LEARNING OBJECTIVE #2: Work through the differential diagnosis for a bloody pleural effusion.

CASE: A 37-year old male presented with severe right chest pain, which began in the right shoulder 7 months earlier while he was incarcerated. A shoulder x-ray was normal, and he was told he had a rotator cuff injury. Over several months, the pain began progressively radiating into the right chest. Two months earlier, the patient was released from prison. Three weeks earlier, he presented to the emergency department with shoulder pain radiating across the chest. Shoulder and chest x-rays were normal. He was again assessed to have a rotator cuff injury. Three days before admission, the pain greatly increased. On presentation, he reported 10/10 pleuritic right lower chest and upper abdomen pain associated with new dyspnea. He denied any trauma and had no significant medical history aside from a 24 pack-year smoking history. On exam, the patient was afebrile, had right-sided splinting, and had diminished breath sounds and dullness to percussion in bilateral lower lung fields and right middle lung field. A chest x-ray showed a large right-sided pleural effusion with near total opacification of the hemithorax. A chest CT scan showed numerous nodular lesions in the left lung. Due to concerns for active tuberculosis (TB), the patient was placed on airborne precautions. A thoracentesis removed 1860 mL of bloody pleural fluid, with reaccumulation within 1 day. Pleural fluid studies showed protein of 4.5 g/dL (serum protein 6.3 g/dL), lactate dehydrogenase (LDH) of 251 U/L (serum LDH 186 U/L), hematocrit of 10.0 % (blood hematocrit 35.3 %), glucose of 54 mg/dL, and adenosine deaminase of 12.3 U/L. No acid-fast bacilli (AFB) were seen. During Video-Assisted Thoracoscopic Surgery (VATS), a mediastinal mass and several pleural lesions were seen and biopsied. A chest tube was placed, followed later by doxycycline pleurodesis. The biopsies and pleural fluid cytology showed a poorly differentiated epithelioid angiosarcoma. The biopsies showed no AFB or granulomas. Airborne precautions were discontinued, and the patient was discharged to start outpatient chemotherapy. The patient was re-admitted 2 days later for Acute Respiratory Distress Syndrome. He was treated for Health-Care Associated Pneumonia, and intubated for 4 days. He then began paclitaxel treatment in the hospital before discharge. After 6 cycles of paclitaxel, the patient had a repeat chest CT scan, which showed regression of his mediastinal mass and decreased intrathoracic lymphadenopathy. He is currently stable at home, continuing chemotherapy.

DISCUSSION: Shoulder pain is a common primary care complaint usually ascribed to a musculoskeletal cause. In this case, however, there was a life-threatening etiology. According to one study of ambulatory visits for shoulder pain in the 1990s, an x-ray was performed in 29.0 % of visits, and further imaging was performed in only 6.5 % of visits (Wofford et al., BMC Musculoskeletal Disord 2005). For our patient, a consistent primary care physician might have found the progress unusual enough to order further imaging, potentially detecting the tumor before it metastasized. After discharge from prison, he was seen repeatedly in the emergency department, resulting in fragmented care (Kulkarni et al., J Community Health 2010). Another major teaching point is the workup of a bloody pleural effusion, which can be either a hemothorax or hemorrhagic effusion. Traditionally, hemothorax is defined by a pleural fluid/blood hematocrit ratio >50 %, while hemorrhagic effusions have a ratio <50 %. Yet because blood can congeal over time, a ratio of 25–50 % can be consistent with a hemothorax. Hemothorax can be caused by trauma, coagulopathies, vascular malformations, certain neoplasms, and other miscellaneous causes. Hemorrhagic effusion is most commonly caused by infections such as tuberculosis, malignancy, or pulmonary infarction. (Ali et al., Chest 2008) Our patient had a borderline pleural fluid/blood hematocrit ratio of 28 %, but the clinical picture seemed consistent with a hemorrhagic effusion. Given his incarceration history, he was initially treated under airborne precautions. However, the lack of constitutional symptoms, negative PPD, negative AFB smears, lack of granulomas on pleural biopsy, and low ADA made active TB less likely. Our workup ultimately led to the diagnosis of a rare malignancy: epithelioid angiosarcoma. This is a rare soft tissue sarcoma with a male

predilection, occurring most commonly in the seventh decade. The tumors are aggressive with early spread and high mortality, but some evidence suggests paclitaxel can improve survival in angiosarcomas. (Hart et al., Arch Pathol Lab Med 2011). In conclusion, this case demonstrates the potential serious etiologies for common primary care complaints, which may be detected earlier with less fragmented care.

ERODING THROUGH: AN UNCOMMON CAUSE OF DYSPHAGIA Aaron K.
 Goodwin; Kristi M. Moore; Rebecca Rawl; Dan Collins. Carolinas Medical Center, Charlotte, NC. (Tracking ID #2197723)

LEARNING OBJECTIVE #1: Surgically implanted cervical hardware may erode into the esophagus months or even years after initial implantation.

LEARNING OBJECTIVE #2: Early diagnosis of esophageal perforation may require multiple diagnostic modalities with prompt surgical management crucial for minimizing morbidity and mortality.

CASE: A 44 year-old man presented to the emergency department with an 8–12 month history of progressive dysphagia to solids and liquids, 80 lb weight loss, odynophagia, and significant dyspepsia. Review of systems was significant for episodic productive cough and orthopnea. Medical history included type 2 diabetes mellitus and a cerebral vascular accident 3 years prior with residual left-sided extremity motor weakness but no resultant speech or swallowing dysfunction. Surgical history was significant for remote traumatic right arm amputation and multiple cervical spine surgeries, with most recent anterior fixation of C3–C7 2 years prior for critical cervical stenosis. Physical examination showed a thin-appearing male in no acute distress with stable vital signs. Neurologic exam showed no cranial nerve dysfunction and stable weakness in left sided extremities. Head and neck exam were unremarkable without palpable abnormality or pain on movement of the neck. Auscultation of the chest was remarkable for mild inspiratory stridor. Initial plain films and computed tomography imaging of head and neck showed surgical fixation of C3–C7 with anterior displacement of C6/C7 hardware and screws into the prevertebral soft tissue without frank intrusion in the esophagus. Barium esophagram with fluoroscopic evaluation showed no esophageal abnormalities. Flexible laryngoscopy was unremarkable for significant findings of the nasopharynx, hypopharynx, and larynx. Gastroenterology was consulted for upper endoscopy which found surgical hardware visualized at the level of the cricopharyngeus. Six days after presentation, the patient underwent removal of cervical hardware and repair of esophageal perforation with placement of percutaneous endoscopic gastrostomy, tracheostomy, and salivary bypass tube. Purulent fluid was found surrounding implanted hardware, and cultures isolated viridans streptococci, *Candida albicans* and Methicillin-resistant *Staphylococcus aureus*. He was treated with a total antibiotic course of four weeks with IV vancomycin and oral fluconazole. Post-operative course was relatively unremarkable, and after an 18 day hospitalization he was transferred to a rehabilitation facility. He has now returned home and denies dysphagia with oral intake.

DISCUSSION: Anterior cervical spinal fixation has become a common management modality for multiple spinal pathologies including fracture, degenerative disc disease and neoplasm. Esophageal erosion and perforation by surgical hardware is uncommon with rates reported as low as 0.15 %. While most often occurring in the early post-operative phase, late-onset cases have been reported with erosion and perforation occurring more than 10 years after surgery. The most common symptoms include neck and throat pain, odynophagia, dysphagia, hoarseness, and aspiration. Less-common presenting symptoms include recurrent pneumonia, fever, cough, subcutaneous emphysema, and neurologic deficits. Our patient presented with progressive dysphagia, odynophagia, and weight loss with recurrent episodes of productive cough. Physician awareness is vital for identifying pertinent presenting symptoms which, in the setting of previous anterior cervical instrumentation, should raise concern for esophageal compression, erosion, and/or perforation. Prompt detection and intervention is crucial as mortality and complication rates rise significantly with delayed detection and intervention. Multiple modalities including CT imaging, endoscopy, and even surgical exploration may be required for diagnosis. In one study of patients with esophageal injury only 72.7 % were accurately diagnosed by imaging. Consequently, negative imaging should not be used as the sole means to rule out esophageal erosion or perforation. Esophageal perforation, as with our patient, is most common at the C5/C6 or C6/C7 level. Underlying causes which commonly lead to erosion include hardware migration, new trauma and chronic compression. Irrespective of cause, essential components of therapy include surgical removal of hardware, abscess drainage with culture-directed parental antibiotics, and salivary fluid diversion. Reports have noted normal swallowing function within 10–14 days after the surgical repair. Often temporary placement of gastrostomy tube is warranted for nutritional support. Esophageal erosion of surgical hardware, though typically occurring in the early post-operative course, may present years later with progressive dysphagia, cough, voice changes, neck pain or recurrent pneumonias among some of the many presenting symptoms. Clinician awareness with prompt diagnosis and surgical intervention are crucial for minimizing morbidity and mortality.

ERUPTIVE XANTHOMATOSIS: A SIGN OF POOR DIABETIC CONTROL
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LEARNING OBJECTIVE #1: This case highlights the importance of recognizing eruptive xanthoma as initial manifestation of hypertriglyceridemia induced acute pancreatitis in the setting of poorly controlled diabetes mellitus. Recognizing clinical manifestations that indicate underlying systemic disease, assessing patient compliance during routine clinic visits, and modifying medication regimen as appropriate is paramount to preventing medical complications and frequent hospitalizations.

LEARNING OBJECTIVE #2: Lastly, we would like to remind clinicians about the importance of glycemic control in preventing eruptive xanthomatosis and associated hypertriglyceridemia induced pancreatitis.

CASE: A 39-year-old Caucasian female with Type 2 diabetes mellitus, hypertension, depression, and body mass index of 40.2 kg/m² presented to clinic with sudden onset of diffuse, pruritic, erythematous papules on the arms, thighs, and behind both knees over the past 5 days. Physical exam showed 3 mm erythematous pustules/papules along the medial aspect of the corresponding areas. Her medications at the time were metformin 1 g twice a day, atorvastatin 40 mg at bedtime, tricar 145 mg every day, and lisinopril 5 mg daily. She reported taking her morning medications consistently but tended to forget the ones to be taken at night. Three weeks later, she was subsequently admitted to the hospital with acute pancreatitis, hyperglycemia (random glucose of 345 mg/dL) and marked hypertriglyceridemia (6000 mg/dL). She was negative for autoantibodies related to Type 1 diabetes and had no family history of diabetes or hyperlipoproteinemia. She improved with intravenous fluids and supportive care. Upon hospital discharge, she was advised to take her evening medications with meals or get a pill box to enhance medication compliance. The eruptive xanthomas had resolved upon routine clinic follow-up two weeks after hospital discharge. Six months later, she was again hospitalized for acute pancreatitis. Of note, she had erythematous, vesicular appearing pustules/papules along back of the neck, medial aspect of both arms, and both thighs starting 2–3 weeks prior to hospitalization. On admission, she had labs consistent with diabetic ketoacidosis (metabolic acidosis with anion gap 18 and elevated beta-hydroxybutyrate), triglyceride 9693 mg/dL, lipase 3883 U/L, random blood glucose 520 mg/dL, and hemoglobin A1C 11.7 %. Her current medications included metformin 1 g twice a day, lantus 50U BID, atorvastatin 40 mg at bedtime, fenofibrate 200 mg daily, Lovaza 4 mg twice a day, and lisinopril 5 mg daily. However, six weeks prior to hospitalization, she had decided to stop atorvastatin, fenofibrate, and Lovaza as she was starting a PlexusSlim diet for weight loss. She was counseled extensively on the importance of medication compliance and received diabetes education during her hospitalization. She was seen by endocrinology and her diabetes medication regimen was adjusted to include Lantus 65 units twice a day and pre-meal Humalog 7 units three times per day with correction scale 2 units: 50 points for blood glucose >150. Skin lesions resolved 3 weeks after initiation of insulin therapy. Repeat lipid panel after 3 months showed triglyceride 811 mg/dL and total cholesterol 228 mg/dL. Subsequent clinic follow-up at monthly interval to assess compliance, barriers to compliance, and glycemic control resulted in gradual improvement in glycemic control with most recent hemoglobin A1C 8.7 % and no further hospitalizations to date.

DISCUSSION: Xanthomas are skin lesions, which develop in the setting of altered systemic lipid metabolism and are characterized by accumulation of lipid-laden macrophages in the dermis. Eruptive xanthomas commonly arise over the buttocks, shoulders, and extensor surfaces of extremities and typically spontaneously resolve over several weeks. Elevated plasma cholesterol or triglyceride levels is present in primary hyperlipoproteinemia in which genetic mutations yield defective Apo lipoproteins or secondary hyperlipoproteinemia, which is seen in diabetes mellitus, nephrotic syndrome, cholestasis, pregnancy, and hypothyroidism. While, eruptive xanthomas have commonly been associated with hypertriglyceridemia, these skin lesions are not a common manifestation of diabetes mellitus. Meanwhile, diabetes mellitus is the most common secondary cause of chylomicronemia, known as diabetic lipemia. Due to the temporal relationship of events and the association of diabetes with secondary hyperlipidemia, this patient's eruptive skin lesions were attributed to hypertriglyceridemia and hyperglycemia. Early recognition of dermatological manifestations of hypertriglyceridemia and hyperglycemia is vital as early medical intervention in the form of medication adjustment could have prevented repeated episodes of pancreatitis and hospitalizations in this patient.

ERYTHEMA MULTIFORME CAUSED BY MYCOPLASMA INFECTION IN AN ELDERLY MAN Noeru Miyake²; Christine Kwan¹. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Sapporo, Japan. (Tracking ID #2199808)

LEARNING OBJECTIVE #1: Recognize that *Mycoplasma pneumoniae* pneumonia can present with erythema multiforme

LEARNING OBJECTIVE #2: Recognize that mycoplasma pneumonia can also cause uveitis, rhabdomyolysis, and glomerulonephritis

CASE: A 79 year-old Asian man presents with 3 days of rash on his entire body, including face, palms, soles, and genitals but without pain, itchiness, or discharge. He also reports fever, sore throat, dry cough, decreased appetite, and sick contact last week. Other review of systems is within normal limits (WNL). Past medical history includes hypertension, dyslipidemia, atrial fibrillation, unstable angina, and asthma. The patient takes candesartan, nifedipine, rosuvastatin, rivaroxaban, and nicorandil; he has no allergies. He has a 20 pack-year smoking history but quit. He is a social drinker but does not use recreational drugs. His family history is unknown. On exam, vital signs show temperature 39.1, heart rate 120, blood pressure 187/106, respiratory rate 31, and O₂ sat 98 % room air. He appears in no acute distress and is alert/oriented x 3. Head exam shows right eye clear discharge and dry oral mucosa. Skin exam reveals 1–15 mm red macules, papules, plaques, and vesicles, including some target lesions, with ill-defined borders on his head, neck, trunk, extremities, palms, soles, and genitals. The rest of his exam, including his lungs, is WNL. Labs, including complete blood counts and chemistries, are WNL except platelets 101 × 10³ /μL, Na 123 mmol/L, Cl 90 mmol/L, AST 51 U/L, lactate dehydrogenase 288 U/L, creatine kinase 1668 U/L, and C-reactive protein 19 mg/dL. Coagulation panel shows slightly increased PT, APTT, fibrinogen, and D-dimer. Autoimmune panel, including MPO-ANCA, RP3-ANCA, and anti-nuclear antibody, is WNL. Urinalysis detects protein, red blood cells (RBC), and RBC casts. Chest x-ray is WNL. Polymerase chain reaction (PCR) of mycoplasma IgG illustrates a titer of 1:80; cold agglutinin titer is WNL. The patient is thus given ciprofloxacin x 14 days for his mycoplasma pneumonia. He also develops uveitis, transaminitis, and congestive heart failure exacerbation for which furosemide is given. Repeat PCR of mycoplasma IgG after 2 weeks shows a titer of 1:640. His rash, most likely erythema multiforme from multi-organ involvement, in addition to the other organ dysfunction, improves within 2 weeks.

DISCUSSION: *Mycoplasma pneumoniae* commonly causes community-acquired pneumonia typically in school-aged children. It produces an exotoxin, community-acquired respiratory disease toxin, which may affect the severity of the disease. Typical signs and symptoms include headache, malaise, fever, sore throat, productive cough, and rales; the disease is usually self-limited. Extrapulmonary signs and symptoms, including hemolysis, skin rash, and heart/gastrointestinal/central nervous system/joint involvement, occur in <5–10 % of patients. This patient also has other less-common organ dysfunction, like uveitis, rhabdomyolysis, and glomerulonephritis. Erythema multiforme, a rare manifestation of <1 % of outpatient visit, is caused by infections (90 %), medications, malignancies, autoimmune diseases, immunizations, radiation, sarcoidosis, and menstruation. Of the infections, herpes simplex virus is the most common cause although *Mycoplasma pneumoniae* is also considered an important cause. Because the rash occurs on this patient's mucous membranes, his erythema multiforme is classified as major. The rash usually resolves spontaneously although oral steroids may be given for severe oral involvement.

ESSENTIAL MIXED CRYOGLOBULINEMIA PRESENTING AS A FEVER OF UNKNOWN ORIGIN IN A MIDDLE AGED WOMAN Mark Schwartz; Sabiha Hussain; Amanda Kaveney. Rutgers Medical School, Morganville, NJ. (Tracking ID #2153573)

LEARNING OBJECTIVE #1: What is the differential diagnosis and initial workup in a patient with fever of unknown origin?

LEARNING OBJECTIVE #2: How should an internal medicine physician manage a patient with essential cryoglobulinemia?

CASE: A 47 year-old female with history of hypertension, type 2 diabetes, asthma, and non-alcoholic liver disease presented with a 3-week history of fever and erythematous rash of the head and trunk. Workup at another hospital 8 days prior to admission was significant for negative blood cultures and mediastinal adenopathy on CT chest. She was treated with a 7 day course of antibiotics with no improvement in symptoms. On presentation to our hospital, significant findings included blood pressure of 79/48, pulse of 120, fever of 39 °C, and altered mental status. Labs were pertinent for leukocytosis, anemia, hyponatremia, transaminitis, lactic acidosis, and elevated inflammatory markers (ESR and CRP). Blood and urine cultures were negative. She was admitted to the ICU and remained febrile despite treatment with broad spectrum antibiotics. She was placed on a cooling blanket and developed a diffuse purple macular papular rash. Addition infectious workup including HIV, hepatitis, cytomegalovirus (CMV), Epstein Barr virus (EBV), adenovirus, human herpesvirus 8 (HHV-8), and tick-borne illnesses was negative. Bone marrow biopsy showed pancytopenia without evidence of malignancy. The patient was found to have positive serum cryocrit and immunofixation suggestive of cryoglobulinemia. The diagnosis of essential CG was made and the patient was treated with Methylprednisolone, plasmapheresis, and Rituximab without improvement. The patient developed ARDS, acute renal failure, and DIC. The patient passed away from a large intracerebral hemorrhage.

DISCUSSION: Fever of unknown origin (FUO) is defined as a temperature greater than 38.3 °C for at least 3 weeks duration and with no established diagnosis after a 1-week

workup. The workup of FUO includes a thorough history, physical examination, laboratory studies, and imaging. The most common causes of FUO include infections, malignancies, and connective tissue disorders. Essential Mixed Cryoglobulinemia (Essential CG) is a vasculitis of the small and medium vessels secondary to the deposition of cryoglobulins, which are polyclonal IgG and IgM immune complexes that precipitate at low temperatures. Essential CG can be associated with viral illnesses, hematologic malignancies, and rheumatologic diseases. The gold standard for diagnosis is a positive serum cryocrit. In patient's experiencing arthralgia's or fatigue, the treatment involves non-steroidal anti-inflammatory drugs. When evidence of end organ damage is present, steroids and immunomodulators are indicated. In severe cases where hyper viscosity syndrome is present, treatment should include plasma exchange. This case illustrates the extensive workup a primary care physician should perform on patients presenting with FUO and a review of Essential CG. When a patient remains febrile on broad spectrum antibiotic therapy, less common causes of FUO such as Essential CG should be considered.

EVALUATION OF PERICARDITIS Jennifer Huang; Ginger W. Wey. Montefiore Medical Center, Bronx, NY. (Tracking ID #2197638)

LEARNING OBJECTIVE #1: Recognize indications for further work-up in a patient with pericarditis.

LEARNING OBJECTIVE #2: Identify common and rare causes of pericarditis.

CASE: A 41 year old African American man with no significant past medical history presented with one day of pleuritic chest pain. His maximal temperature was 103 F, his blood pressure was 120/80, and his heart rate was 100. His lungs were clear to auscultation, and cardiac exam was significant for a pericardial friction rub, but no murmurs. His electrocardiogram revealed diffuse ST elevations with reciprocal ST depression in aVR. He was diagnosed with acute pericarditis, which was managed with colchicine and ibuprofen. Upon further questioning, he also reported concomitant night sweats, a 10-lb unintentional weight loss, progressive dyspnea on exertion in the preceding months, and dysphagia to liquids. He did not report Raynaud's phenomenon, and he had not travelled recently. On closer examination, erythematous nodules were noted on the extensor surfaces of his legs, but no joint swelling or erythema was found, nor was he noted to have any lymphadenopathy or elevated jugular venous pressure. Labs were remarkable for negative serial cardiac enzymes, blood urea nitrogen of 8 mg/dL, creatinine of 0.8 mg/dL, C-reactive protein of 22 mg/dL, angiotensin-converting enzyme level of 60 U/L, and erythrocyte sedimentation rate of 71 mm/h. His autoimmune work-up, including anti-dsDNA, anti-Ro/La, anti-centromere, and anti-RNA polymerase antibodies, was negative. He screened negative for HIV and hepatitis B and C. Tuberculin skin testing revealed 0 mm of induration 2 days after placement. Chest x-ray was negative. No pericardial effusion was noted on echocardiogram. CT chest was notable for mediastinal and bilateral hilar adenopathy, as well as extensive peripheral cystic and fibrotic changes. An endobronchial ultrasound-guided fine needle aspiration of mediastinal lymph nodes was performed. Cultures were negative, but pathology showed non-necrotizing granulomas. He was diagnosed with sarcoidosis and started treatment with oral prednisone with improvement in his rash and respiratory symptoms.

DISCUSSION: Acute pericarditis is the most common manifestation of pericardial disease, occurring in up to 5 % of patients presenting to emergency rooms with non-ischemic chest pain. Patients who present with pericarditis are often not extensively evaluated due to the usually benign course of the illness and the low diagnostic yield of such work-ups. Idiopathic pericarditis accounts for nearly 90 % of all cases in some studies, and a specific etiology is found in less than a quarter of patients, with neoplasia, tuberculosis, and autoimmune disease being the most common causes. Among these patients with known etiologies, most patients in developed nations are thought to have viral etiologies, whereas patients in developing countries are later diagnosed with HIV or tuberculosis. All patients should be questioned about other systemic symptoms to evaluate for possible underlying diseases. Patients who do not respond appropriately to anti-inflammatory medications should also be further evaluated. Further testing for those with a positive review of systems or poor clinical response can include chest x-ray, electrocardiogram, echocardiogram, tuberculin skin testing, blood tests (e.g. complete blood count, basic metabolic panel, blood cultures, thyroid-stimulating hormone level, HIV screening), and an autoimmune work-up (e.g. antinuclear antibodies, rheumatoid factor, anti-dsDNA antibodies). In addition, those at high risk for coronary artery disease should be ruled out for myocardial ischemia. Patients should also be evaluated for possible pericardial effusion or cardiac tamponade due to the possible need for pericardiocentesis. Pericardial biopsy is reserved for those with recurrent cardiac tamponade or for patients in whom bacterial or neoplastic pericarditis is suspected. In the case of the described patient, the presence of multiple systemic symptoms prompted further evaluation, which led to his eventual diagnosis. Systemic inflammatory diseases in which pericarditis is more commonly seen include systemic lupus erythematosus, adult Still's disease, systemic sclerosis, and mixed connective tissue disease. Pericarditis is much rarer (less than 10 % of patients) in sarcoidosis, rheumatoid arthritis, dermatomyositis, polymyositis, Sjogren's syndrome,

and Behcet's disease. Although most patients with idiopathic or viral pericarditis have a good prognosis, it is important for the general clinician to recognize high risk patients to diagnose and treat underlying systemic disease.

EXPANDING THE DIFFERENTIAL DIAGNOSIS FOR PAINLESS JAUNDICE

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LEARNING OBJECTIVE #1: Recognize that Bouveret's syndrome can manifest in a wide variety of clinical presentations, which includes painless jaundice.

CASE: A 62 year-old female presented with a 3 week history of increasing jaundice, fatigue, and nausea with an associated 15 lb weight loss. The patient denied abdominal pain and abdominal examination was unremarkable. Initial laboratory studies were significant for total bilirubin 9.3 mg/dL, alkaline phosphatase 477 U/L, aspartate aminotransferase 95 U/L, and alanine aminotransferase 111 U/L. Initial ultrasound revealed intrahepatic and extrahepatic biliary dilatation. Magnetic resonance cholangiopancreatography (MRCP) showed a suspected calculus located in the proximal portion of the duodenum with surrounding soft tissue thickening. Endoscopic gastroduodenoscopy (EGD) confirmed a large gallstone in the duodenal bulb which occupied the entire lumen and partially protruded through the pylorus. As this was unable to be removed endoscopically, the patient underwent gastrostomy and removal of a 3.3 cm gallstone. No fistulous tract was appreciated intraoperatively and is considered to have closed spontaneously. Subsequently, the patient was treated supportively and discharged home on post-operative day 7 with resolution of her symptoms and normalization of her laboratory values.

DISCUSSION: Bouveret's syndrome refers to gastroduodenal obstruction from gallstone impaction which occurs in the setting of a cholecystoduodenal fistula. Depending upon the exact location and size of the gallstone, a variety of clinical manifestations are possible. Bouveret's syndrome was first reported in 1896 and remains an uncommon variant of gallstone ileus, for which it comprises only 1–3 % of cases. While a wide variety of presenting symptoms have been reported, to our knowledge no reported case of Bouveret's syndrome has presented as painless jaundice, which in this case was a result of external common bile duct compression. The largest review was published in 2006 by Cappell and Davis where they describe 128 cases. The most common presenting symptoms were nausea, vomiting, abdominal pain, hematemesis, and weight loss. Less commonly, patients reported an absence of abdominal pain in 29 % and Jaundice in less than 2 % of cases. The mean age of patients at diagnosis was 74, and had a female predominance of nearly a 2:1 ratio. As in our case, EGD reveals gastric outlet obstruction in almost all cases; however, the etiology of obstruction can only be determined 69 % of the time. While EGD is useful diagnostically, endoscopic gallstone retrieval is usually unsuccessful due to the size of the gallstone. Thus, treatment of the obstructive process most often requires gastrostomy or enterolithotomy and is 90 % successful.

EXPECTING THE EXPECTED EVEN AT UNEXPECTED TIMES Hirotaka Kato; Nehal Galal; Patricia Dharapak. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2197680)

LEARNING OBJECTIVE #1: Recognize the diverse manifestations of cryoglobulinemia.

LEARNING OBJECTIVE #2: Early consideration of cryoglobulinemia in a patient with HCV and unexplained symptoms.

CASE: A 51 year-old man with a history of untreated HCV diagnosed in 2002, prior heroin abuse on methadone maintenance presented with a 2-day history of hematuria and right upper quadrant pain. The physical exam was significant for mild diffuse discomfort to palpation of the abdomen and no evidence of ascites or peripheral edema. Initial labwork revealed stable normocytic anemia and hepatic function compared to prior values: HB 11.7G/DL, Platelet 251 K/UL, AST 36U/UL, ALT 50 U/L, Total bilirubin 1.8MG/DL, albumin 3.1 G/DL, INR 1.3, HCV-RNA 460978 IU/ML, Genotype 3a. Amylase and lipase were normal. Rapid HIV 1/2AB was nonreactive. BUN 26MG/DL and Cr 1.54MG/DL were elevated from normal values 4 months earlier. Urinalysis was notable for 30 protein, 19 RBC and 11–25 granular casts. Results of an abdominal CT suggested cirrhosis and splenomegaly. A HIDA scan was negative. Despite medical therapy, the patient's abdominal pain persisted and he soon developed non-oliguric acute kidney injury with peak Cr 2.71MG/DL. Repeat urinalysis showed worsening hematuria (>182 RBC) and proteinuria (300) with a spot urine protein/creatinine ratio of 0.97G, fulfilling criteria for nephritic syndrome. There was new microcytic anemia: HB 7G/DL, MCV 78FL and a palpable purpuric rash developed on the patient's extremities with spread to his face and trunk. Additional workup suggested mixed cryoglobulinemia: isolated low C4 (3MG/DL), elevated serum IgM (288MG/DL), elevated RF (249 IU/ML), positive serum cryoglobulin, negative ANA, normal UPEP and serum viscosity.

Renal biopsy showed proliferative glomerulonephritis with cryoglobulin deposits. The patient was treated with plasmapheresis and intravenous pulsed dosed steroids with renal function recovery to BUN 25MG/DL, Cr 0.9MG/DL. He was discharged on an oral steroid taper with plans to initiate outpatient treatment for HCV. Shortly after discharge, the patient was readmitted twice for recurrent episodes of diffuse pulmonary alveolar hemorrhage requiring intubation and plasmapheresis. Fortunately, his clinical course stabilized such that he was finally initiated on Ribavirin and Sofosbuvir with good virologic response to date (HCV-RNA: undetectable IU/ML). His most recent renal function is stable at Cr 1.31MG/DL and his hemoglobin has improved to 11.1G/DL.

DISCUSSION: Cryoglobulins are single or mixed immunoglobulins that undergo reversible precipitation at low temperatures. The clinical manifestations of cryoglobulinemia relate to the type of cryoglobulin involved but all typically cause a syndrome of systemic inflammation in part from immune complex deposition. The mean reported age is 42–52 with a female: male ratio of 3:1. Mixed cryoglobulinemia is commonly associated with chronic inflammatory states and viral infections including HCV and rarely associated with lymphoproliferative disorders. The diagnosis is mainly clinical with supportive laboratory and histology. Cutaneous manifestations are almost always present—typically palpable purpura over dependent areas. Other manifestations can include arthralgias, myalgias, fatigue, peripheral neuropathy, abdominal pain, pulmonary infiltrates and renal disease. As one of the most serious complications, renal involvement manifests early and with an incidence of up to 60 %. Failure to treat may result in renal failure—those with HCV associated disease appear to be at greater risk. Membranoproliferative glomerulonephritis is almost always the histologic lesion in mixed cryoglobulinemia. Isolated proteinuria and hematuria are typical clinical findings. While mixed cryoglobulins are present in >30 % of patients with chronic HCV, the clinical syndrome of cryoglobulinemia remains uncommon. Our case highlights the importance of keeping a high index of suspicion of acute cryoglobulinemia in patients with HCV presenting with nonspecific abdominal pain and acute kidney injury, even when these symptoms precede cutaneous manifestations. Prompt diagnosis and control of the immune phenomena with immunosuppressive medications and/or plasmapheresis and early antiviral treatment of HCV is indicated to prevent catastrophic outcomes. The prognosis in patients with HCV will depend on their response to anti HCV therapy.

EXTENDING THE DIFFERENTIAL FOR CHRONIC COUGH: AN ATYPICAL PRESENTATION OF BACTERIAL ENDOCARDITIS Rachel Solomon²; Aparna Sarin²; Jenny J. Lin¹. ¹Mount Sinai, New York, NY; ²Mount Sinai Medical Center, New York, NY. (Tracking ID #2196114)

LEARNING OBJECTIVE #1: Recognize endocarditis as a potential cause of chronic cough

CASE: A 61 year old man with history of hypertension on lisinopril presented to clinic with 2 months of dry cough that began immediately following the first of five surgeries requiring intubation for vitreous hemorrhage. He worked as an administrator, had a distant smoking history, and drank one alcoholic beverage each night. He denied dyspnea, fevers, chills, and night sweats, but continued to have significant lacrimation from the right eye. He had a history of seasonal allergies and stated that he had found Afrin nasal spray helpful in relieving his symptoms. On exam, his lungs were clear; he had boggy turbinates and cobblestoning of the posterior oropharynx. He was treated for likely postnasal drip with nasal corticosteroids and loratadine. Two months later, he returned with recurrent dry cough off treatment. In the interim, he had seen specialists who had stopped his lisinopril, treated him for cough variant asthma with albuterol, and started him on omeprazole for possible GERD. Exam remained unchanged. The initial regimen was re-started. A week later, the cough persisted and he reported new night sweats. He had no daytime symptoms or increased fatigue. Chest x-ray was negative for pulmonary process, but showed possible tracheal thickening. Subsequent CT scan was completely unremarkable. However, labs showed WBC 12.5 (85 % neutrophils) and hemoglobin drop to 13.3 from 14.9. The following week he returned with daily drenching night sweats. Urine dip was normal. Given absence of localizing symptoms, blood cultures were sent. Within two hours, both bottles grew out gram-positive cocci in chains. The patient was admitted to the hospital where he was found to have a small vegetation on his mitral valve. Cultures later grew out *Streptococcus mitis*. Cough resolved following appropriate antibiotic therapy for infective endocarditis; and the patient has remained symptom free for 11 months.

DISCUSSION: Chronic cough, a dry cough lasting more than 3 weeks, is a common complaint in primary care. When evaluating patients, most internists employ a diagnostic algorithm that guides consideration of the most common diagnoses: upper airway cough syndrome (often due to allergic rhinitis or sinusitis), asthma, GERD and medication side effect (ACE-inhibitors and Angiotensin Receptor Blockers). Where common causes of chronic cough are absent, infective endocarditis—a potentially life-threatening ailment requiring prompt treatment with prolonged antibiotics—becomes an important consideration. Cough is rarely remembered as a presenting symptom of infective endocarditis (IE). However, in both the pre- and post-antibiotic eras, cough has been described as an early

symptom of IE. A review published by Pelletier et al. reports accompanying cough in 8 to 24 % of cases of bacterial endocarditis. Cough secondary to endocarditis is often described as a “tickle,” worse with standing, and improved on lying down. It can be spasmodic; worse in late afternoon and at night. Not much is known about how or why infective endocarditis causes cough. In some cases, progression of valvular disease causes congestive heart failure or embolization to lung results in pulmonary infection. Our patient did not have either of these associated complications. A case report from Mayo Clinic in 1995 describes a similar situation in which a patient presenting with chronic cough and elevated inflammatory markers was found to have IE uncomplicated by either CHF or pulmonary infection. In this patient, as in ours, cough improved within 24 h of initiating antibiotic therapy. This association suggests that bacteremia may, itself, be the etiology for cough in IE. Our patient was worked up and treated appropriately for common causes of chronic cough. However, his cough persisted and he began to display symptoms of systemic disease (night sweats) and changes in his laboratory profile (leukocytosis). In patients presenting with persistent chronic cough, especially when accompanied by “B symptoms” and abnormal laboratory findings, bacterial endocarditis should be a part of the extended differential and ESR, CRP and blood cultures should be obtained.

EXTRAHEPATIC BILIARY ADENOMAS: RARE BUT WITH AGGRESSIVE CLINICAL COURSE Kah Poh Loh; Deborah Nautsch; David Desilets; James Mueller; Vaibhav Mehendiratta. Baystate Medical Center/Tufts University, Springfield, MA. (Tracking ID #2197713)

LEARNING OBJECTIVE #1: Identify the clinical course of extrahepatic biliary adenomas

LEARNING OBJECTIVE #2: Recognize the challenges in the distinction between extrahepatic biliary adenomas vs adenocarcinomas

CASE: Biliary adenomas are rare entities that are usually detected incidentally in gallbladders removed for cholelithiasis or chronic cholecystitis. They can also occur anywhere in the extrahepatic biliary tree. Currently, there is limited understanding of the malignant potential of biliary adenomas involving the extrahepatic tree, and there are no guidelines for management. The aim of our study was to identify all extrahepatic biliary adenomas diagnosed at our tertiary care institution and review the natural course and management. Additionally we performed a literature search on published cases of extrahepatic bile duct adenoma. The pathology database (CoPath) at our institution was used to identify patients with a diagnosis of biliary adenoma or adenomatous change on biopsy or surgical resection specimens from year 2000 to 2013. Pathology results from 8774 cholecystectomies (with or without bile excision) and 1785 bile duct punch biopsies were reviewed. Twenty-three patients with biliary adenomas were identified, arising either in the gallbladder (20/23) or the extrahepatic biliary tree (3/23). All gallbladder biliary adenomas were detected incidentally during cholecystectomy for unrelated indications. Patient's medical records from the three patients with extrahepatic biliary adenomas were reviewed for demographics, clinical presentations, imaging, operative findings and surgical pathology results. The study was approved by the institutional review board at our institution. All three patients with extrahepatic biliary adenomas (2 in common bile ducts, 1 in hepatic duct) were female with a mean age of 74 years. On initial presentation, none of the patients had obstructive jaundice but two of three patients had symptoms of biliary origin. Case 1 had biliary dilation seen on chest imaging and endoscopic ultrasound revealed a sessile adenomatous polyp in the distal bile duct. Patient refused surgery and presented with occlusive biliary stricture and jaundice 5 months after initial presentation. Brush cytology confirmed malignant progression. Case 2 had history of primary sclerosing cholangitis and presented with cholangitis, gram-negative sepsis. A polypoid lesion was seen on imaging in the common hepatic duct and direct cholangioscopy with biopsies confirmed the presence of adenoma with high-grade dysplasia. Patient underwent successful total bile duct resection and hepaticojejunostomy but represented 1 year later with diffuse metastatic disease to the bone, liver and peritoneum. Case 3 presented with symptoms suggestive of gallbladder pathology and was found to have polypoid bile duct lesion on intraoperative cholangiogram. Endoscopic retrograde cholangioscopy showed adenomatous polyp with high-grade dysplasia involving distal common bile duct. Patient underwent distal bile duct resection with choledochojejunostomy but presented with jaundice 4 years after surgery. She was found to have adenocarcinoma involving small bowel in the Roux limb of jejunum and transverse colon.

DISCUSSION: Extrahepatic bile duct adenoma appears to be disease of older patients. In our review of literature, the age of presentation ranged from 15 to 85 years with a mean age of 62.5±16.0 years (male, 60.8±15.6 years; female, 64.6±16.8 years). Affected gender was male in 23 cases and female in 18 cases with gender not reported in 3 cases. Thirteen

cases were reported in the US, 15 in the UK, 13 in Asia with the rest in the Middle East. The most common presenting complaints were abdominal pain, jaundice, fever, pruritus, and abnormal liver tests. Management for extrahepatic bile duct adenoma is not clearly defined. Most patients with CBD adenomas in the reported cases underwent Whipple's procedure. Radiofrequency ablation or photodynamic therapy have been shown to be safe and effective in the management of malignant biliary obstruction and treatment of benign biliary strictures, and may be reasonable alternatives to surgery for removal of adenomas. However, this needs to be further evaluated in prospective clinical trials. Majority of the patients had good short-term outcomes. Five cases (including our 3 patients) had interval malignancy including cholangiocarcinoma, small and large bowel carcinoma. Associations were found with certain malignancies and syndromes either at presentation or follow-up which includes Gardner's syndrome, familial polyposis coli or periampullary carcinoma. In summary, we highlight the rarity of extrahepatic bile duct adenoma with three additional cases from our institution adding to the paucity of literature on the subject. All three patients in our series presented with interval gastrointestinal malignancy. We recommend aggressive surgical intervention and close postoperative surveillance when diagnosis of extrahepatic bile duct adenoma is made.

EXTRANODAL LYMPHOMA IN THE ELDERLY PATIENT Keerthi R. Karamched; Lauren Ludwig, Washington University, Saint Louis, MO. (*Tracking ID #2195143*)

LEARNING OBJECTIVE #1: Recognize the subtle and various presentations of undiagnosed lymphoma in the elderly population.

CASE: This patient is a 73-year-old Caucasian female with a history of hypothyroidism, osteopenia, and hypertension who presented to clinic with lower left thigh pain. Patient reported waking up in the middle of the night with a spasm in her thigh. She immediately jumped out of bed and started walking. After approximately 10 min, her spasm subsided. The first time this episode happened was 8 months prior. The second episode of similar but more severe pain happened 2 months ago lasting about 1 week. She had two more episodes of this spasm and pain. Her pain was described as a sharp left knee pain with radiation to the left groin. Her pain initially used to improve with physical activity, but as time progressed, activity seemed to no longer have an effect. At the time of presentation, the patient reported that her pain episodes were occurring about once every 2 weeks. She denied any fevers, chills, erythema, or swelling. Physical examination showed the patient was afebrile with stable vital signs. Examination showed no significant restriction of range of motion on the left thigh. Physical examination was otherwise unremarkable. X-ray of her left hip showed a marrow replacing process within the femoral shaft with periostitis and cortical thickening. PET scan showed abnormal uptake in vertebrae, ribs, pelvis, femur, and inguinal lymph node. Biopsy of the left femur showed Diffuse Large B-cell Lymphoma.

DISCUSSION: Malignant tumors of the hematopoietic cells and lymphoreticular system are called lymphomas. In general, lymphomas are divided into Hodgkin's and Non-Hodgkin's Lymphoma. Non-Hodgkin's Lymphoma is three times more common than Hodgkin's Lymphoma and has a greater tendency to metastasize to extra-nodal tissues. Up to 20–40 % of Non-Hodgkin's Lymphomas are extra-nodal at the time of diagnosis. Lymphoma has a bimodal distribution of presentation with the first peak of diagnosis in the teens followed by the next peak in people greater than 65 years of age. While nodal disease is more prevalent in younger patients, elderly patients have more extra nodal disease, as was the case in our patient. Commonly involved sites in extra-nodal disease include Intestinal, Vascular, Bone, Bone Marrow, Uterine, Oral, etc. We present a case of extra-nodal Non-Hodgkin's lymphoma in an elderly female which, in this case, had bone involvement. Typically, symptoms of nodal disease include malaise, fevers, weight loss, and drenching night sweats; these symptoms are classified as "B" symptoms which occur in about 50 % of lymphoma presentations. With bone involvement, patients present with bone pain, swelling, palpable mass, neurologic symptoms, or even a pathologic fracture. The differential diagnosis for intermittent muscle spasm and bone pain is fairly broad and can include muscular strain, ligamentous injury, fracture, or malignancy given the intermittent nature and duration of symptoms. The differential for malignancy leading to bone pain includes multiple myeloma, osteosarcoma, lymphoma, chronic osteomyelitis, primary bone sarcoma, leukemic infiltrate, and metastatic cancer. It is most remarkable in our patient that the nature of her complaint was mild and intermittent. She did not have the typical "B" symptoms of lymphoma. Because older patients are more likely to present with extra nodal disease, it is important to recognize that even mild symptoms can be indicative of lymphoma.

FALLING THROUGH THE GAP: FATIGUE AND A LOW ANION GAP AS PRESENTING FEATURES OF MULTIPLE MYELOMA IN A 48 YEAR OLD PATIENT. Andrew Trifan, University of Pittsburgh, Pittsburgh, PA. (*Tracking ID #2196693*)

LEARNING OBJECTIVE #1: Differentiate cancer related fatigue from generalized fatigue.

LEARNING OBJECTIVE #2: Recognize the causes of a low anion gap and that myeloma can present in younger individuals with only anemia as a main feature.

CASE: A 48 year old truck driver presented with a several month history of fatigue and shortness of breath. Aside from a heavy smoking history (60 pack-years), he had no other pertinent past and could not recall the last time he saw a physician. His symptoms started 5 months prior to presentation, around the end of November. They gradually worsened to the point that he could not perform even the most routine tasks at work without becoming severely short of breath. Two separate urgent care centers both diagnosed him with viral bronchitis, and given his smoking history, sent him home with antibiotics each time. The antibiotics did not help and no amount of rest improved his fatigue. He was forced to call off work a few weeks prior to arrival, something he had never done in his career. With an associated 30 lb weight loss over the same time period, he came in to the hospital for evaluation. On arrival his vitals were stable and exam noteworthy for trace diffuse expiratory wheezing and a 2/6 flow murmur at LLSB with the remainder of the exam within normal limits. Pertinent labs included a sodium 121 mEq/L, creatinine 1.0 mg/dL, glucose 120 mg/dL, calcium 8.0 mg/dL, anion gap 2 mEq/L, WBC 6.1, Hgb 5.6 gm/dL, and MCV 110. Malignancy was highest on the differential, however CT chest and stool hemocult were both negative. The low anion gap however was striking, prompting further lab tests. His albumin was 2.6gm/dL and total protein was 15.8 gm/dL. Bone survey did not show any lesions nor did the patient ever mention pain as a symptom. SPEP/UPEP and serum free light chain assay demonstrated an IgG kappa monoclonal protein with an M-spike 7.44, B2 microglobulin of 11 and serum viscosity 4.2. Bone marrow aspirate revealed 95 % plasma cells and circulating plasma cells <10 % of total cells in peripheral blood. He was diagnosed with stage III multiple myeloma as per the International Staging System. He was referred to hematology to begin treatment.

DISCUSSION: Fatigue is a common complaint encountered in the primary care setting. While everyone in their lives at some point feels tired, usually temporally associated with an event and relieved after rest, fatigue from an underlying malignancy is different. It is perceived as more intense, not relieved by rest or sleep and completely interferes with all aspects of living. Up to 40 % of patients with underlying malignant disease report fatigue as an early symptom. In this case, the patient described fatigue that interfered with his ability to do work and that sleeping over 12 h per day did not help. While anemia from malignancy proved to be the reason for his symptoms, it is important in the primary care clinic to consider other common etiologies, like depression. Common teaching in medical school and residency emphasizes the mnemonic CRAB (hyper-Calcemia, Renal insufficiency, Anemia, Bone lesions) as a useful aid in the presentation of multiple myeloma. It is important to recognize that this disorder, associated with aging (median age 66), does not always present with this constellation of findings and care must be taken to not disregard a differential because it does not present in a typical age group or in a classic way. While anemia itself is seen in 80 % of cases, bone pain is present only 50 % of the time, and hypercalcemia or renal insufficiency are even less common. There are also several laboratory features associated with multiple myeloma that are exemplified in this case. The marked anemia stands out as the most striking, however the pseudohyponatremia and elevated MCV, due to elevated proteins, are also remarkable. The low anion gap is of interest as well. Causes of a low anion gap include lab error (most common), a decrease in anions (low albumin) or elevation in cations (elevated proteins, calcium or potassium, or lithium intoxication). An isolated low anion gap is not a sensitive marker for myeloma, however if present in correct clinical context, such as in this patient, further workup clarifying the etiology for the low gap is warranted. To summarize this case, internists need to have a fine tuned ear when patients come in with complaints of fatigue, whether in the hospital or clinic, to help decide how aggressively to pursue a further workup. It is also important to recognize that disorders do not always present in the "classic" ways or in association with mnemonics that have been taught in training, such as this case of myeloma with only anemia, and to remember that even something as trivial as an anion gap can sometimes help make the right diagnosis.

FANCONI SYNDROME AND AKI SECONDARY TO TENOFOVIR THERAPY IN AN HIV PATIENT: A CASE REPORT Mark P. Dresselhouse²; Bassam Bader¹; Ijeoma Nnodim Opara¹. ¹Detroit Medical Center, Detroit, MI; ²Wayne State University School of Medicine, Detroit, MI. (*Tracking ID #2193672*)

LEARNING OBJECTIVE #1: Diagnose Fanconi Syndrome in a patient taking Tenofovir (especially in combination with other medications) for the treatment of HIV

LEARNING OBJECTIVE #2: Recognize that routine monitoring of kidney function is essential in HIV patient

CASE: We describe the case of a 62-year-old woman with a past medical history of hypertension, hyperlipidemia, and HIV (diagnosed in 1997) that presented to our hospital in November 2014 at the request of her primary care physician due to abnormal routine labs. She described a 4-month history of polyuria, polydipsia, nocturia, fatigue, a 10 lb weight loss, dizziness, and changes in vision along with a 9-day history of bilateral proximal thigh pain and weakness. Her follow-up for her routine management was discontinued because the patient lost her health insurance in June 2014. For the last 4 years she has taken Atazanavir, Ritonavir, and Emtricitabine-Tenofovir Diproxil Fumarate (Truvada) with no complications. Her CD4 count the day before admission was 644 with an undetectable HIV RNA level. On admission, she presented with severe hypokalemia (1.9 mEq/L), normal anion gap metabolic acidosis (Bicarbonate 16 mEq/L, Anion Gap 14), and acute kidney injury (Creatinine 1.84 mg/dL, BUN/Cr Ratio 6). Urinalysis showed a pH of 6.5, 1.010 specific gravity, 1+ blood, 2+ protein, and 2+ glucose with fine granular casts in urine sediment. Physical exam was benign except for 4/5 strength on right hip flexion and extension. Bilateral renal ultrasound was negative. The patient was additionally taking lisinopril, atorvastatin, and gemfibrozil. Further labs revealed uricosuria, aminoaciduria, hypophosphatemia, hyperchloremia, and hypomagnesemia. Fanconi Syndrome was diagnosed secondary to Tenofovir treatment for HIV. Patient's HIV medication and lisinopril was discontinued. She was given IV fluids, bicarbonate, potassium, and magnesium replacements. Her creatinine improved and electrolytes stabilized over her 6-day course. She was discharged in stable condition on oral electrolyte replacements and eventually recovered back to her baseline.

DISCUSSION: Tenofovir was approved in 2001 by the FDA for the treatment of HIV. During major clinical trials, renal toxicity was not a significant finding but it was observed in a dose-dependent manner in animal trials. Several case reports in the last 13 years have showed that Fanconi Syndrome, Diabetes Insipidus, and renal toxicity are uncommon but possible reactions to Tenofovir treatment. This case describes yet another patient taking Tenofovir that developed Fanconi Syndrome and AKI with severe symptomatic hypokalemia, hyperchloremic normal anion gap metabolic acidosis and proteinuria. Interestingly, the symptoms that she experienced developed soon after she lost her health insurance. During this time, she was not followed routinely by a primary care physician and obtained her HIV medication through state aid. If she had a way to easily see her doctor, she likely would have, and the progression of her clinical symptoms could have been prevented. Previously published case reports have highlighted the need for routine monitoring of Tenofovir treatment, especially when combined with Ritonavir (which was also taken by the patient). Ritonavir has been shown to increase intracellular concentrations of Tenofovir in the proximal tubule by inhibiting Multidrug Resistance Protein 2 (MRP2) on the apical side of the proximal tubule. This increase in concentration inside the proximal tubule increases the risk of dose-dependent toxicity and tubular damage—necessitating strict monitoring of kidney function. In conclusion, this case further adds to the evidence supporting the need for strict monitoring of renal function while patients are on combination antiretrovirals including Tenofovir. Furthermore, it provides an educational opportunity to physicians, identifying a rare but serious side effect of a commonly used HIV medication.

FAVISM CAUSING METHEMOGLOBINEMIA IN G6PD DEFICIENCY Anupam Kotwal; Rand Nashi; Oliver Marasigan. University of Massachusetts, Worcester, MA. (Tracking ID #219352)

LEARNING OBJECTIVE #1: Recognize the clinical features of hemolytic anemia and methemoglobinemia

LEARNING OBJECTIVE #2: Understand the management of methemoglobinemia in the setting of G6PD deficiency

CASE: A 43 year old Albanian man without any significant past medical history, presented to the hospital with sudden onset intermittent dyspnea, chills and dark urine of 4 days duration. He had started consuming fava beans for the first time in his life, 2 weeks prior to presentation. Examination revealed scleral icterus, conjunctival pallor and sublingual cyanosis. His arterial oxygen saturation (SaO₂) was 86 % on pulse-oximetry but 100 % on arterial blood gas (ABG). This prompted checking a methemoglobin (MetHb) level which was elevated at 8 %. He did not have hepatomegaly or splenomegaly. Laboratory workup revealed hemoglobin of 8 g/dL (14 g/dL at baseline), leukocytosis, hyperbilirubinemia, hemoglobinuria, elevated LDH, high reticulocyte index and low haptoglobin. Peripheral smear demonstrated polychromasia, nucleated RBCs, anisocytosis and spherocytes. EKG, chest x-ray and troponin were unremarkable. Management was initiated with oxygen, RBC transfusion, intravenous fluids and low dose ascorbic acid. During his hospital course of 3 days, leukocytosis resolved and anemia

responded adequately to transfusion. His symptoms, cyanosis and jaundice also resolved and oxygen saturation normalized to 100 % on pulse-oximetry. He was prescribed folic acid on discharge, and provided with a list of medications and foods including Fava beans to avoid. On follow up, he remained asymptomatic, anemia resolved and G6PD level was 1.5 unit/g of Hemoglobin (normal 8–13).

DISCUSSION: Glucose-6-phosphate dehydrogenase (G6PD) deficiency is an X-linked disorder which makes red blood cells (RBCs) more susceptible to oxidant stress. It is the most common enzyme deficiency of the RBCs, affecting approximately 400 million people around the world. The ingestion of Fava beans in these individuals usually triggers acute hemolysis, but is rarely severe enough to cause Methemoglobinemia. Studies report certain medications and infections triggering isolated hemolysis in G6PD deficient adults. A thorough PubMed search yielded only 4 reports of G6PD deficient adults developing both hemolysis and Methemoglobinemia and none of these cases implicated Fava beans as the inciting factor. Our patient demonstrated clinical and laboratory features of hemolytic anemia. The cyanosis, discrepancy between SaO₂ on pulse-oximetry and ABG with a normal paO₂ pointed towards Methemoglobinemia, which was confirmed by elevated MetHb. His Mediterranean descent raised concern for G6PD deficiency. Methylene blue is considered if the patient is symptomatic or if MetHb is greater than 20 %, however it is ineffective and may worsen the hemolysis in G6PD deficiency. Low enzyme level obtained after resolution of acute hemolysis established the diagnosis of G6PD deficiency. The ingestion of Fava beans shortly prior to symptom onset, and resolution of illness on avoidance, implicates it as the oxidant stress. Hemolysis in an adult of Mediterranean descent should raise concern for G6PD deficiency. Heinz bodies and Bite cells are characteristic of these cases but their absence does not exclude the diagnosis. Methylene blue should not be used to manage Methemoglobinemia in diagnosed or suspected G6PD deficiency. Ascorbic acid should be used as antioxidant as it does not require G6PD to reduce MetHb. This case demonstrates the “textbook” presentation of Favism causing hemolytic anemia along with Methemoglobinemia in a G6PD deficient adult, which is unique to the current body of literature.

FLUOROQUIN-OW!-LONES Olivia Van Gerwen. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198437)

LEARNING OBJECTIVE #1: Recognize the importance of considering drug side effects in creating a differential diagnosis

LEARNING OBJECTIVE #2: Understand the impact of fluoroquinolone-induced tendon rupture on patients, especially the elderly

CASE: A 69-year-old man presented with two days of left lower extremity pain, erythema, as well as bilateral lower extremity weakness. Review of systems was also positive for subjective fevers, chills, night sweats, and rigors during this time. At the time of admission, he was being treated as an outpatient for a recurrent epididymitis/orchitis infection, for which he had received 7 days of levofloxacin therapy. On admission, his vitals were temperature of 99.6, heart rate of 74, respiratory rate of 18, blood pressure of 133/57 and he was saturating 99 % on room air. On exam, he was noted to have a diffusely erythematous, non-edematous scrotum that was extremely tender to palpation. There was no discharge and no ulceration noted on the penis. His left lower extremity had decreased range of motion, was warm to touch, and was edematous on the lateral aspect of the ankle. Notable labs included a WBC count of 19.6 with a neutrophilic predominance of 81 %. Initially these symptoms were thought to be due to a lower extremity cellulitis or septic arthritis of the ankle, so he was started on vancomycin and piperacillin-tazobactam. Throughout the hospitalization, however, his leukocytosis persisted and he began to spike daily fevers to 102. Multiple sets of blood cultures, including those initiated prior to the initiation of broad-spectrum antibiotics, were negative. Orthopedics performed an arthrocentesis that revealed no infective organism. MRI of the left calf and ankle revealed multiple torn ligaments. After many days without any improvement of the patient's fevers, leukocytosis, and ankle pain, the decision was made to stop antibiotics, as the team no longer felt that these symptoms were infectious in origin. Likely, the fevers were secondary to the new antibiotics started during the admission and the ankle symptoms were secondary to fluoroquinolone-induced tendon rupture. After these changes were made, the patient's fevers and leukocytosis improved within days and he was discharged with plans for physical therapy to address his tendon injury.

DISCUSSION: Oral antibiotics are prolific in general internal medicine practice, even in the presence of increased stewardship among practitioners. Since they are so often prescribed in outpatient settings, it can be easy to view them as essentially harmless medications. However, fluoroquinolones can have serious side effects. Patients taking fluoroquinolone antibiotics are four times more likely than the general population to experience Achilles tendon rupture. Such complications can occur days to weeks after the initiation of the antibiotic and can be debilitating enough to merit hospitalization and cause prolonged periods of disability, especially in the elderly. The mechanism of this adverse reaction is not fully understood. When prescribing fluoroquinolones, especially to elderly patients, practitioners should consider potential adverse effects like tendon injury

and the potential disability they could cause. Additionally, drug side effects are an important part of any differential diagnosis, especially in patients recently placed on a new medication.

FROM BAD TO WORSE: RECURRENT FLASH PULMONARY EDEMA FROM NATIVE AORTIC VALVE ENDOCARDITIS Ranjan Pathak¹; Smith Giri³; Paras Karmacharya¹; Ana Abaroa-Salvatierra²; DILLI R. POUEL¹; Sushil Ghimire²; Raju Khanal²; Christian Espana Schmidt². ¹Reading Health System, West Reading, PA; ²Reading Hospital, West Reading, PA; ³University of Tennessee Health Science Center, Memphis, TN. (Tracking ID #2199034)

LEARNING OBJECTIVE #1: Recognize aortic regurgitation as a complication of acute aortic valve endocarditis

CASE: A 71-year-old-man, recently discharged from the hospital with streptococcal agalactiae bacteremia and native aortic valve endocarditis on ceftriaxone, was readmitted with acute onset dyspnea from acute decompensated heart failure. After initial improvement with diuretics, patient developed worsening shortness of breath on day 2 with repeated episodes of flash pulmonary edema. Transesophageal echocardiogram revealed worsening left ventricular ejection fraction (46 to 30 %), severe aortic regurgitation with prolapse of the left and non-coronary cusps and multiple valvular vegetations. He underwent emergent bioprosthetic aortic valve replacement. Ceftriaxone was continued for a total of six weeks.

DISCUSSION: Acute aortic regurgitation (AR) is a life threatening medical emergency that has high morbidity and mortality if not recognized early. Infective endocarditis of the aortic valve can cause valvular destruction and acute regurgitation, which may present as acute flash pulmonary edema. Rapid valve destruction or rupture of peri-valvular abscess into left ventricle can result in acute AR. Acute AR presents with sudden cardiovascular collapse with features of cardiogenic shock like profound hypotension and acute dyspnea. In the setting of new onset or worsening heart failure, the suspicion for acute AR should be high. Diagnosis can be confirmed by echocardiography. Intra-aortic balloon pump is contraindicated for the management of cardiogenic shock in AR. Emergent cardiothoracic surgery evaluation with replacement or repair of the valve is the treatment of choice.

FROM STING TO STEMI: MECHANISMS AND MANIFESTATIONS OF KOUNIS SYNDROME Ryan J. Gosselin; Ian S. Gross. North Shore Medical Center, Salem, MA. (Tracking ID #2199106)

LEARNING OBJECTIVE #1: Recognize Kounis Syndrome as an uncommon entity which initially manifests as common acute coronary syndrome.

LEARNING OBJECTIVE #2: Describe the three variants of Kounis syndrome and the postulated mechanisms that lead to them.

CASE: A 69 year old man with past medical history of hyperlipidemia became unresponsive while driving his car and was discovered by EMS to be hypotensive and with weak pulses. EKG in the field showed ST elevations in leads II, III, and aVF. He was intubated enroute to the emergency department, and placed on a dopamine drip on arrival for a blood pressure of 55/31. Repeat EKG in the emergency department showed ST depressions in II, aVF, V2, V3, V4, and V5. He was given an aspirin suppository, placed on a heparin drip, and transitioned from dopamine to norepinephrine for vasopressor support before being sent for urgent cardiac catheterization. A single 40 % fixed defect was discovered in the patient's RCA with TIMI-3 flow across the lesion; pressure catheter showed an FFR of 0.87 after administration of adenosine. His distal RCA appeared normal, and no other lesions were found. Ventriculogram showed no wall motion abnormalities. No stent was placed. Norepinephrine was rapidly weaned during the catheterization and through his transfer to the ICU. Troponin I elevated to 0.07 after an initial normal finding. He regained consciousness and was extubated shortly after arriving to the ICU. He subsequently recalled having been stung by a "large wasp" minutes prior to getting in his car, with ensuing onset of lightheadedness as he backed out of his parking spot. Yellow Jacket IgE was elevated to 7.36 kU/L.

DISCUSSION: Kounis Syndrome is defined as the concurrence of acute coronary syndromes with platelet activation and mast cell mediated anaphylactic or anaphylactoid reactions. Three variants of this entity have been described: the Type I variant includes patients with normal coronary arteries and no CAD risk factors in whom coronary artery spasm manifests along a spectrum from angina without elevated cardiac enzymes all the way to STEMI with significant myocardial damage. Type II includes those with preexisting but previously stable atheromatous disease, as was the case with our patient, in which the inflammatory cascade induces coronary spasm and/or plaque rupture. The Type III variant includes stented patients in whom in-stent thrombosis develops, with subsequent staining of the thrombotic aspirate showing presence of eosinophils and mast

cells. It appears that inflammatory cells are activated even prior to the coronary event, and that mast cell degranulation precedes the acute coronary event in addition to subsequent infiltration of the culprit lesion. Guinea pig models have shown that pump failure precedes hypotension, showing that vascular permeability and decreased venous return are unlikely the primary causes of depressed cardiac output, and suggesting that the ischemic myocardial damage seen in Kounis Syndrome is a primary event, not just a downstream effect from systemic vasodilation. Certainly the initial presentation of our patient was consistent with cardiogenic shock from right ventricular failure in the setting of inferior STEMI. And though elevated levels of mast cell contents such as histamine, tryptase, and arachadonic acid products are seen in ACS without correlation to an allergic event, it may be a critical threshold level of these mediators that lead to coronary artery spasm and/or plaque rupture in Kounis Syndrome.

FULMINANT TYPE 1 DIABETES MIMICKING ACUTE PANCREATITIS Naoki Matsuura; Hiroko Morisaki; Satoshi Matsunaga; Syunpei Yoshino; Masatomo Kiyota; Hiroshi Imura; Mitsuo Kozuru. Aso Iizuka Hospital, Iizuka, Japan. (Tracking ID #2192667)

LEARNING OBJECTIVE #1: Recognize the clinical features of fulminant type 1 diabetes

LEARNING OBJECTIVE #2: Recognize errors led by the heuristics in the daily practice

CASE: A 36 year-old male with no significant past medical history but who had been drinking excessive amounts of alcohol for several years presented at another hospital with left upper quadrant abdominal pain, vomiting and thirst. The symptoms had started the previous day. He was 173 cm tall and weighed 67 kg, his BMI was 22.4 kg/m². Though the abdominal ultrasound examination was unremarkable, abdominal tenderness and elevated pancreatic enzymes (serum amylase 309 U/L and lipase 793 U/L) resulted in a diagnosis of acute alcoholic pancreatitis. His physician had tried to have him hospitalized but the patient had refused and started taking clear liquid at home. After 4 days, his symptoms worsened and he presented again at his former hospital. Further laboratory tests revealed severe metabolic acidosis (pH 7.119), positive urine ketones by dipstick test, and hyperglycemia (24 mmol/l). His HbA1c was 6.3 % (NGSP). He was hospitalized with a diagnosis of pancreatitis and subsequent hyperglycemia. IV fluids, antibiotics, gabexate mesilate and SC insulin were started. Although his symptoms improved, at his request he was transferred to our hospital 4 days later. Following the fine course on symptoms and normalized laboratory tests we initiated oral feeding and continued insulin therapy but the hyperglycemia persisted. Six days after admission to our hospital, his fasting serum C-peptide level was low (0.04 ng/mL) and a glucagon injection yielded no response. We finally decided on a diagnosis of fulminant type 1 diabetes and after instruction about diabetes and insulin usage he was discharged.

DISCUSSION: Type 1 diabetes is characterized by the inability to secrete insulin resulting from the selective destruction of the pancreatic beta cells. Since 2000, fulminant type 1 diabetes, a novel subtype which occurs abruptly, has appeared in Asia, mostly in Japan. This subtype is characterized by 1) ketosis or ketoacidosis within a week of the onset of hyperglycemic symptoms, 2) a relatively low level of HbA1c on the first visit and 3) elevated pancreatic enzymes. The prevalence of fulminant type 1 diabetes is very rare among Caucasians and tends to be disregarded in Western countries. A nationwide survey in Japan reported some unique findings in this subtype; 71.7 % of the patients had flu-like symptoms; 72.5 % had abdominal symptoms, and 98 % showed an increased level of serum exocrine pancreatic enzymes. Interestingly, only 4.8 % of patients in this subtype were positive for islet-related autoantibody (all of them were positive for anti-GAD antibody), which suggests that this subtype would belong to "type 1B" of the American Diabetes Association classification, an idiopathic form of type 1 diabetes. In this case, prolonged hyperglycemia gave us an important clue and the existence of ketoacidosis at the onset of symptoms supported our suspicions. Ironically, the presentation of a heavy drinker at the hospital complaining of abdominal pain with elevated pancreatic enzymes artfully mimicked that of acute alcoholic pancreatitis and misled the physician. To make matters worse, the facts that the patient had already been diagnosed and his symptoms had improved, clouded our judgment. In other words, "confirmation bias" was precipitated by the presentation of the patient and our "anchoring and adjustment" was largely a waste of time. Reference: Imagawa A, Hanafusa T, Uchigata Y, et al. Fulminant Type 1 Diabetes: A nationwide survey in Japan. Diabetes Care 2003; 26(8): 2345-2352

FUNGUS FUNGUS EVERYWHERE! Michelle O. Forson¹; Sathish kumar Krishnan²; Navdeep Kaur¹. ¹Presence St Francis Hospital, Evanston, IL; ²St. Francis Hospital, Evanston, IL. (Tracking ID #2180818)

LEARNING OBJECTIVE #1: Emphasizing the rising incidence of invasive aspergillosis in non neutropenic patients.

LEARNING OBJECTIVE #2: Recognizing the role of a short course of steroid therapy in the development of invasive aspergillosis.

CASE: A 79 year old female presented with a 3 day history of rash over her back which developed following a course of ciprofloxacin for her urinary tract infection. Her past medical history includes diabetes mellitus, COPD and congestive heart failure. Physical examination revealed desquamating maculopapular rash involving the anterior and posterior torso with ulcers in her oral mucosa. We made a diagnosis of Steven Johnson Syndrome and started intravenous methylprednisolone 80 mg every 12 h with intravenous immunoglobulin. On day 3 of admission, she developed cough and dyspnea. Physical examination showed bibasilar crackles and chest X-ray revealed bibasilar infiltrates. She was treated with intravenous aztreonam and vancomycin for suspected hospital acquired pneumonia. As the patient's skin and mucosal lesions improved, we tapered her dose of methylprednisolone to 40 mg daily. Her dyspnea however continued to worsen and she developed encephalopathy and acute kidney injury. A CT scan revealed consolidation of the lower lobe of left lung. A bronchoscopy with broncho-alveolar lavage was performed. Smear from broncho-alveolar lavage (BAL) showed many polymorphonuclear leukocytes, gram positive cocci in clusters and rare *Aspergillus* mold. Legionella antigen was negative. Therapy with Tigercycline and Voriconazole was instituted. Nevertheless, her overall condition worsened: she developed multiorgan failure with features of disseminated intravascular coagulation and expired. Autopsy revealed invasive pulmonary aspergillosis with extensive hematogenous dissemination to the stomach, spleen, brain and heart (including septic embolic in coronary vessels and concomitant myocardial infarction). Culture from the BAL identified the *Aspergillus* specie as *Aspergillus flavus*.

DISCUSSION: Invasive Aspergillosis (IA) is a severe fungal infection with progression across tissue planes. *Aspergillus fumigatus* accounts for 67 % of IA cases. Our patient had *Aspergillus flavus* which accounts for about 10–13 % of IA cases. Experimental data on *A. flavus* also suggests it is more virulent than *A. fumigatus*. IA is relatively common in neutropenic patients; however our patient's absolute neutrophil count was between 1900 and 10,000 during her admission. Invasive Aspergillosis has a high mortality rate (50–80 %); and a few studies show an even higher mortality in non neutropenic patients. Current recommendations though, do not include prophylaxis for non-neutropenic patients. The higher mortality rate seen in non neutropenic patients is partly due to the difficulty in diagnosing IA in this population, especially considering the ubiquitous nature of *Aspergillus*. The diagnosis of IA is usually based on clinical probability as well as isolation of the organism. However clinical probability is founded on the presence of risk factors and clinical features. The traditional invasive aspergillosis risk factors clinicians are conversant with include; neutropenia, hematologic malignancies, organ transplant, liver cirrhosis, and immunosuppression. Long-term steroid use (greater than or equal to 30 days) is a widely accepted risk factor for IA. However, IA is considered a rare complication in patients who have received intense immunosuppressive regimen used to treat autoimmune disorders, but have not undergone transplantation. Nevertheless, it is likely in our patient that short course steroid therapy was a predisposing factor. Our patient received only 10 days of steroids before developing fulminant pulmonary features. Invasive aspergillosis is an emerging cause of mortality in non neutropenic patients with nontraditional risk factors including short course steroid therapy. Therefore, a high index of suspicion will aid in the diagnosis and initiation of appropriate antifungal therapy.

GASTRIC BYPASS...THE START OF A CHAIN REACTION Amy H. Farkas¹; Kevin Kraemer². ¹UPMC, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2198090)

LEARNING OBJECTIVE #1: Recognize the risk of alcohol use disorders (AUD) after gastric bypass surgery

LEARNING OBJECTIVE #2: Assess other etiologies for cirrhosis in patients with AUD

CASE: A 36 year-old woman with Roux-en-Y gastric bypass 7 years ago presented with worsening ascites and leg edema. She did well after gastric bypass until 1 year ago when she started drinking heavily, progressing to "one-fifth" hard liquor daily. She stopped alcohol use completely 8 months ago after she was diagnosed with Wernicke-Korsakoff syndrome. One month ago, she presented to an outside hospital with new ascites. Outside work-up revealed a CT scan with hepatic steatosis and cirrhosis, AST 41 IU/L, ALT 15 IU/L, negative hepatitis A, B, and C titers, and negative mitochondrial and anti-smooth muscle antibodies. She was diagnosed with alcoholic cirrhosis. Upon presentation to our service, she reported increasing abdominal and leg swelling. Family history included a niece with Wilson's disease. Our exam revealed ascites, pitting leg edema, and poor short-term memory. She did not have Kayser-Fleischer rings but no slit-lamp exam was done. A diagnosis of Wilson's disease was confirmed by laboratory evaluation: ceruloplasmin 13.2 mg/dL (normal 22–58 mg/dL) and 24-h urinary copper 139 ug (normal 20–65 ug).

DISCUSSION: With over 1/3 of the US population qualifying as obese¹, more patients are being considered for gastric bypass surgery. Evidence suggests that AUD increase after

gastric bypass surgery, specifically Roux-en-Y procedures. A prospective cohort study of 1945 adults undergoing gastric bypass surgery found the prevalence of AUD was significantly higher in the second postoperative year (9.6 %) compared to the year prior to surgery (7.6 %, $p=0.01$)². Patients who were male, younger, smokers, had regular use of alcohol prior to surgery or prior recreational drug use, had lower sense of belonging, or had Roux-en-Y compared to gastric band procedures were more likely to develop AUD. A recent study found that 7 % of patients at year 1 and 6 % of patients at year 2 develop new high risk drinking behaviors following gastric bypass; however the overall rate of AUD was unchanged from baseline³. Gastric bypass, particularly Roux-en-Y, alters alcohol metabolism resulting in higher blood alcohol concentrations and longer time to return to sobriety^{4–5}. This may place patients at risk for developing AUD. While patients are screened for AUD prior to undergoing gastric bypass, it is important to provide education to patients regarding changes in alcohol metabolism after bypass and to continue screening these patients for AUD as they may represent a high risk group. This case also illustrates the importance of assessing for other etiologies of cirrhosis, even in patients with known AUD. In our patient, the relatively brief (<6 months) period of reported heavy alcohol use should have raised suspicion for an additional etiology. Ultimately, she was diagnosed with Wilson's disease. While her elevated AST/ALT ratio was considered evidence of alcoholic cirrhosis, this ratio is also elevated in Wilson's disease, particularly in patients with acute liver failure⁶. In individuals under 40 years-old, Wilson's disease should be considered as it tends to present at younger ages⁷. In this patient, the interaction of AUD and Wilson's disease possibly led to a more accelerated course to cirrhosis. Further, Wilson's disease may have contributed substantially to her cognitive impairment, which was initially thought to be secondary to gastric bypass-related nutritional deficiencies and AUD. References ¹Ogden, CL, Carroll, MD, Kit, BK. Prevalence of childhood and adult obesity in the United States, 2011–2012. JAMA. 2014;311:8:806–14. ²King, WC, Chen, JY, Kalarchian, MA, Steffen, KJ, Engel, SG, Courcoulas, AP, Pories, WJ, Yanovski, SZ. Prevalence of alcohol use disorders before and after bariatric surgery. JAMA. 2012;307:23:2516–25. ³Wee, CC, Mukamal, KJ, Huskey, KW, Davis, RB, Colten, ME, Bolcic-Jankovic, D, Apovian, CM, Jones, DB, Blackburn, GL. High-risk alcohol use after weight loss surgery. Surg Obes Relat Dis. 2014;10:505–15. ⁴Steffen, KJ, Engel, SG, Pollert, GA, Cao, L, Mitchell, JE. Blood alcohol concentrations rise rapidly and dramatically after Roux-en-Y gastric bypass. Surg Obes Relat Dis. 2013;9:470–3. ⁵Woodard, GA, Downey, J, Hernandez-Boussard, T, Morton, JM. Impaired alcohol metabolism after gastric bypass surgery: a case-crossover trial. J Am Coll Surg. 2011; 212:2:209–14. ⁶Schilsky, ML. Wilson's disease: clinical manifestations, diagnosis, and natural history. Uptodate. Accessed December 30, 2014 http://www.uptodate.com/contents/wilson-disease-clinical-manifestations-diagnosis-and-natural-history?source=search_result&search=Wilson%27s+disease&selectedTitle=1%7E142 ⁷Pratt, DS, Kaplan, MM. Evaluation of abnormal liver-enzyme results in asymptomatic patients. NEJM. 2000;342:17:1266–71.

GASTROINTESTINAL TRACT INVOLVEMENT IN A PATIENT WITH SYSTEMIC AL AMYLOIDOSIS. Dhruvan Patel¹; Aparna Basu¹; Smarika Sapokota¹; Indumathy Varadarajan². ¹Mercy Catholic Medical Center, Philadelphia, PA; ²Hanemann University Hospital, Philadelphia, PA. (Tracking ID #2200278)

LEARNING OBJECTIVE #1: Gastrointestinal amyloidosis should be considered as a differential diagnosis in a patients with unexplained chronic gastrointestinal symptoms.

LEARNING OBJECTIVE #2: Congo Red Staining of biopsy specimen should be considered a routine for patients undergoing endoscopy directed biopsy for chronic gastrointestinal symptoms associated with unintentional weightloss

CASE: Thirty-nine year old man with B/L carpal tunnel syndrome presented with 4 month history of nausea, vomiting, abdominal bloating, non bloody diarrhea. His symptoms were intermittent with a loss of ten pounds in 3 months. He denied any loss of appetite. He denied any bone pain. He had previously been treated with omeprazole with no relief. CT abdomen and pelvis was negative for any acute pathology. His physical examination was unremarkable. Given chronicity of symptoms, he underwent upper endoscopy, which showed mild gastric inflammation. Biopsy of the gastric antrum showed amorphous eosinophilia proteinaceous material which appeared apple green refringent under polarized light with congo red stain, consistent with gastric amyloidosis. Further evaluation showed a high kappa light chain level of 4090 mg/l with low lambda light chain level of 3 mg/l and a high free kappa to lambda ratio of more than 1000. Bone marrow biopsy was done which demonstrated increased plasma cell. Flow cytometry of bone marrow biopsy showed 11.9 % of monoclonal plasma cells with cytoplasmic kappa light chain. A skeletal survey was negative for lytic lesions. Thus final diagnosis of gastrointestinal involvement with immunoglobulin Kappa chain amyloidosis was made. He was started cyclophosphamide, bortezomib and dexamethasone. Following initiation of treatment his kappa light chain level decreased from 4090 to 700 and his symptoms gradually resolved.

DISCUSSION: AL amyloidosis is caused due to deposition of protein derived from immunoglobulin light chain fragments in different tissues, resulting in disruption of tissue

structure or function. It is usually caused by an underlying monoclonal plasma cell dyscrasia. It can be systemic involving different organ system or localized to a single organ. However, GI involvement is very rare. GI involvement in amyloidosis is defined as the presence of GI symptoms with direct biopsy verification. In a large series of patients with AL amyloidosis 8 % of 769 patients had biopsy proven disease and 1 % were symptomatic. The symptoms vary from GI bleeding, malabsorption, protein losing enteropathy to chronic gastrointestinal dysmotility presenting as nausea, vomiting, constipation or diarrhea. These symptoms are believed to be due to mucosal infiltration and neuromuscular infiltration of the bowel by amyloid. Treatment of the underlying plasma dyscrasia leads to resolution of symptoms of the organs affected by amyloidosis. As seen in our case the patient's symptoms resolved as his free kappa chain levels decreased. The underlying plasma cell dyscrasia in our patient was immunoglobulin light chain disease. The definitive treatment of immunoglobulin light chain disease is hematopoietic stem cell transplant. Patients who are ineligible for hematopoietic stem cell transplant can be treated with mephan plus dexamethasone or bortezomib based regime such as CyBORd (cyclophosphamide, bortezomib, dexamethasone). Most patients have good response to therapy and an excellent median-survival. But untreated and undiagnosed AL amyloidosis is invariably fatal. Our case highlights that gastrointestinal amyloidosis should be considered as a differential diagnosis in a patients with unexplained chronic gastrointestinal symptoms.

GENDER INEQUALITY? A CASE OF AORTIC DISSECTION PRESENTING AS ALTERED MENTAL STATUS IN AN OTHERWISE HEALTHY 46 YEAR OLD WOMAN Devin B. Malik; Akshay Amaraneni; Sukhpreet Singh; Sourabh Aggarwal. Western Michigan University School of Medicine, Kalamazoo, MI. (Tracking ID #2197569)

LEARNING OBJECTIVE #1: To recognize that the classic signs and symptoms of aortic dissection are typically absent in females

CASE: A 46 year old lady with a 60-pack-year smoking history presented to the emergency room with a one day history of numbness and tingling in her right face with progressed to confusion, agitation within hours. Non-contrast computed tomography (CT) of the head was negative for hemorrhage and Magnetic Resonance Imaging (MRI) of the brain was ordered to evaluate for stroke. The patient became unresponsiveness on the table with vitals and exam consistent with impending cardio-pulmonary collapse. She was subsequently intubated and started on an epinephrine drip. Physical exam showed facial plethora, non-collapsing internal jugular veins, and skin mottling from chest cephalad. No murmurs or extra heart sounds were auscultated. A chest radiograph, electrocardiogram, complete blood count, electrolyte panel and cardiac enzymes were all normal. Patient had a stat CT chest done to evaluate for possible pulmonary embolism. Surprisingly, a 4.6 cm type A dissecting thoracic aneurysm with pericardial tamponade was discovered. She was taken for emergency surgery where a Dacron sleeve was placed. Patient remained on vasoactive-pressor support for 24 h and eventually died of disseminated intravascular coagulation.

DISCUSSION: Aortic Dissection is a life threatening condition that classically presents as tearing chest pain in a middle aged hypertensive man with a pulse deficit. Women, however, often present without the above classic symptoms which unfortunately leads to a delayed diagnosis and increased mortality. Clinicians often rely on classic symptoms of sudden tearing chest pain that occur in a 40-70 year-old man with hypertension and atherosclerotic disease. The objective findings of a pulse deficit, widening of the mediastinum on radiograph are common findings in men. Gender-related differences in aortic dissection are often overlooked and an international registry was created and published in *Circulation* in 2004. Most notably women with aortic dissection were older, waited a longer period before first medical contact, were diagnosed later in the hospital and had a higher in hospital mortality than their male counterparts. Furthermore, women presented with altered mental status and had higher complications of pericardial effusion and tamponade. In our case, the patient was fairly young and without hypertension and dyslipidemia. The etiology of her thoracic aortic aneurysm remains unknown. She was not tested for syphilis and there was no reported family history of collagen disorders. This case highlights the importance of educating clinicians about gender related differences in the presentation of acute aortic dissection.

GETTING INTO THE GROOVE: A RARE TYPE OF PANCREATITIS Sarah Fishman; Dmitry Kozhevnikov. Lenox Hill Hospital, New York, NY. (Tracking ID #2200764)

LEARNING OBJECTIVE #1: Describe a rare type of segmental pancreatitis

LEARNING OBJECTIVE #2: Understand the presentation and diagnosis of groove pancreatitis

CASE: A 61 year old male with a history of heavy alcohol use and multiple admissions for chronic pancreatitis presented with a 4 day history of nausea and vomiting. Nine months

earlier he had been evaluated by his primary care doctor for a one month history of progressive jaundice. Initial workup revealed a cholestatic elevation in liver enzymes and a direct bilirubinemia. MRCP suggested distal common bile duct stricture. ERCP confirmed this finding and suggested possible cholangiocarcinoma or pancreatic adenocarcinoma. Tumor markers including CA 19-9 and CEA were normal. A biliary stent was placed and jaundice resolved. Subsequent ERCP to exchange the stent revealed chronic calcified pancreatitis and adenopathy in the peripancreatic and porta-hepatis areas with persistent distal common bile duct stricture. Biopsies were taken from the pancreatic head which were suggestive of chronic pancreatitis but were negative for malignant cells. On this admission, blood-work revealed profound hypokalemia and a severe metabolic alkalosis along with elevations in alkaline phosphatase, GGT, and bilirubin while amylase and lipase were normal. Abdominal CT with oral contrast revealed partial gastric outlet obstruction. A nasogastric tube was placed to decompress the stomach. Repeat MRCP was notable for gastric outlet obstruction and a pancreatic head mass involving the second portion of the duodenum. Repeat ERCP showed partial obstruction in the duodenal cap with edematous folds. Biopsies were again taken from the head of the pancreas, which were negative for malignancy. Tumor markers CA 19-9 and CEA were again normal. The decision was made to place a PEJ tube for patient nutrition and a venting PEG tube was placed for oral liquid intake. The patient was started on prednisone to reduce pancreatic inflammation and was discharged to a subacute rehabilitation facility. Patient was readmitted 5 days later with biliary sepsis and once stabilized, was evaluated for gastrojejunostomy and transferred to the surgical service.

DISCUSSION: Paraduodenal pancreatitis, also known as "Groove pancreatitis" is a rare type of segmental pancreatitis affecting the potential space between the head of the pancreas, the duodenum, and the common bile duct. The clinical manifestations and the radiographic appearance of this entity make it a diagnostic challenge. A rare condition in the US, groove pancreatitis is associated with male gender and alcohol abuse. This variety of pancreatitis can mimic the effects of a pancreatic mass and can cause biliary and gastric outlet obstruction. The diagnosis is frequently delayed by concern for malignancy due to its imaging characteristics and functional biliary obstruction.

GETTING TO THE HEART OF IT: AN UNEXPECTED METASTASIS OF A COMMON MALIGNANCY Nicole R. Zeisig; Ahmed Ansari; Jill Grounds; Shima Mousavi; Neda Zarrin-Khameh; Chirayu Shah. Baylor College of Medicine, Houston, TX. (Tracking ID #2194836)

LEARNING OBJECTIVE #1: Diagnose newly discovered cardiac masses

LEARNING OBJECTIVE #2: Recognize cervical cancer as a rare cause of metastatic cardiac tumors

CASE: A 51 year old woman presented with 1 month of progressive dyspnea on exertion, increasing abdominal girth and 20 lbs weight gain. She denied fevers, night sweats, nausea, vomiting, chest pain, orthopnea, paroxysmal nocturnal dyspnea, cough, abdominal pain, change in bowel habits, or bleeding. She was found to have significant JVD, clear lungs, hepatomegaly, abdominal distension, and lower extremity edema. Labs were remarkable for a platelet count of 10 K/uL, BNP of 937 pg/mL, and LDH of 904 U/L. EKG was notable for low voltage without ischemic changes or right-sided strain. The echocardiogram showed an 8x5 cm mass occupying most of the right ventricle with extension into the tricuspid and pulmonic valves. Further imaging with CT Chest showed similar right ventricular findings, a moderate pericardial effusion, and multiple bilateral pulmonary emboli. CT of the abdomen and pelvis showed small ascites, but no other masses. The patient underwent a right heart catheterization for biopsy of the mass. Immediately after the biopsy the patient went into PEA arrest and died. Autopsy showed the mass to be metastatic non-keratinizing squamous cell carcinoma of the uterine cervix. The cervix appeared nodular and erythematous with lower uterine segment narrowing but no distinct masses.

DISCUSSION: The discovery of cardiac masses can lead to diagnostic challenges as direct biopsy of the mass can be associated with significant complications. Metastatic disease to the heart is 40 times more common than primary cardiac tumors. Therefore, extensive imaging and age-appropriate cancer screening should be performed to identify another source amenable to biopsy. The incidence of cardiac metastases in cancer patients at autopsy ranges from 1.5 to 20.6 % (average of 6 %). Intracavitary growth of secondary heart tumors is unusual. In a retrospective study of over 12,000 autopsies, the three most common secondary cardiac tumors originated from lung, esophagus, and lymphoma. For women, metastatic breast cancer should also be considered. Most cardiac metastases are found at autopsy, but reported antemortem cases have presented with cardiac arrhythmias, heart block, heart failure, valvular or intracavitary obstruction, pericardial effusions, and pulmonary embolisms. Metastases from uterine cervical cancer have decreased drastically due to routine Pap tests, but when present most often involve lung, bone, and cervical or supraclavicular lymph nodes. Cardiac metastasis from uterine cervical cancer is extremely rare with an incidence of 3-4 % on autopsy. Only a handful of cases of cervical cancer have presented with cardiac metastasis as their first presentation. This case represents the first reported patient in which cervical cancer manifested with an isolated cardiac mass without

a discrete cervical mass. Because this condition is usually associated with widely metastatic disease and carries such a grave prognosis, a limited number of case reports describe antemortem diagnoses of cardiac metastasis from cervical cancer, and even less data exist to guide life-prolonging therapies.

GETTING TO THE HEART OF LOWER BACK PAIN Julie Burgess. UCSF, San Francisco, CA. (Tracking ID #2199038)

LEARNING OBJECTIVE #1: Recognize vertebral osteomyelitis as a commonly subtle clinical syndrome often without findings classically associated with infection

LEARNING OBJECTIVE #2: Appreciate the role of erythrocyte sedimentation rate (ESR) in the initial evaluation of complicated lower back pain

CASE: A 76 year-old man with hypertension and depression presented with 2 weeks of lower back pain. He reported the gradual onset of progressively worsening, constant, non-radiating left lower back pain that was aching at rest and sharp with movement. Pain was most severe with movement and at night, interfering with sleep. He tried Ibuprofen, Hydrocodone-Acetaminophen, and warm compresses without improvement. He denied preceding trauma. For the 4 days prior to presentation he had been nearly bedbound because of pain, whereas at baseline he would bike for one hour per day. He noted a 10 to 15 lb weight loss over the month prior to presentation, significant fatigue, decreased appetite, and depression. He denied lower extremity weakness, sensory change, incontinence, fever, or history of intravenous drug use. He was afebrile and appeared uncomfortable due to significant pain with movement. He had a II/VI systolic murmur. He had mild tenderness over the left lumbosacral paraspinal muscles, with no spinal tenderness. Straight leg raise was negative bilaterally, with normal strength, sensation, and rectal tone. Initial evaluation showed a white blood cell (WBC) count of $9 \times 10^9/L$ and X-Ray of the lumbar spine showed severe osteoarthritis, but was otherwise unremarkable. After 3 days, his pain had not improved, and he was noted to have a diastolic murmur. ESR obtained at that time was >100 mm/h and C Reactive Protein (CRP) was 95 mg/L. Two of two blood cultures grew *Viridans Streptococcus*. MRI of the lumbar spine showed osteomyelitis and discitis of L4/5 with a large epidural phlegmon extending into the left psoas. Transthoracic and transesophageal echo demonstrated new moderate to severe aortic insufficiency without vegetation. He was diagnosed with vertebral osteomyelitis secondary to aortic valve subacute bacterial endocarditis.

DISCUSSION: Back pain is one of the most common complaints in outpatient medicine, with approximately 95 % of cases attributable to a mechanical etiology. Vertebral osteomyelitis is a rare but serious cause of back pain commonly initially misdiagnosed as mechanical in nature, which often leads to a delay in diagnosis. As seen in this case, approximately 30 % of patients with pyogenic vertebral osteomyelitis have associated endocarditis. The red flags of acute lower back pain include not only the neurologic signs and symptoms heralding cauda equina or acute cord compression, but also constitutional symptoms, fever, weight loss, nocturnal pain, and spinal tenderness which may be associated with malignancy or infection. Forty to sixty-five percent of patients with vertebral osteomyelitis have a normal WBC count, and fewer than 33-50 % have fever. Plain films of the spine are normal in up to 50 % of patients, particularly early in the course. The vast majority of patients with back pain due to osteomyelitis have an elevated ESR, and more than half have positive blood cultures. Joint clinical practice guidelines published by the American College of Physicians and the American Pain Society recommend consideration of ESR as part of the initial evaluation of patients with lower back pain and indicators of a potentially serious condition, which include history of malignancy, unexplained weight loss, age over 50, fever, intravenous drug use, or recent infection. ESR is a relatively inexpensive and sensitive test for pyogenic vertebral osteomyelitis (sensitivity of 85 %) and should be strongly considered in the initial evaluation of complicated lower back pain and of pain not improved after 4–6 weeks of conservative management. Infection and malignancy are highly unlikely with a normal ESR. If ESR is found to be elevated, the next step in evaluation should be spine MRI.

GI BLEEDING IN SYSTEMIC SCLEROSIS Jianhua A. Tau; Andrew Caruso; Jeffrey T. Bates. Baylor College of Medicine, Houston, TX. (Tracking ID #2200300)

LEARNING OBJECTIVE #1: Recognize the association of Systemic Sclerosis (SSc) and Gastric Antral Vascular Ectasia (GAVE)

CASE: A 38 year old female with a history of diffuse Systemic Sclerosis on prednisone (5 mg daily) presents with a two month history of worsening dyspnea on exertion, fatigue and exercise intolerance. She was diagnosed with Systemic Sclerosis within the past year after developing characteristic skin changes on her face and extremities. She was started on prednisone alone and tapered gradually over the past 6 months. Clinically, she had improvement in her skin tightness, but developed very subtle but progressive dyspnea on exertion and fatigue. She denies dysphagia and significant weight loss. On exam, she is pale but without icterus. Her skin exam reveals no new changes. Her heart, lung and

abdominal exam are benign. She has no organomegaly. A rectal exam does not reveal gross fresh blood or melena. A complete blood count and ferritin revealed a new microcytic anemia consistent with iron deficiency anemia. Hemoglobin was 6.9 g/dL, MCV was $71 \mu m^3$, ferritin was 16 ng/mL. She denies NSAID use, hematochezia, hematemesis, hematuria, menorrhagia, jaundice, personal or family history of bleeding disorders. Her family history is significant for fatal gastric cancer in her mother at the age of 50. An endoscopy was done which revealed severe Gastric Antral Vascular Ectasia (GAVE), which was promptly treated with argon plasma coagulation with success. The patient required no further therapy besides iron supplementation. Her anemia improved and notably resolved after 3 months.

DISCUSSION: Gastric Antral Vascular Ectasia (GAVE) is an uncommon and poorly-understood gastrointestinal manifestation of Systemic Sclerosis (SSc) which can lead to chronic anemia. On endoscopy, characteristic dilated small blood vessels are found in the antrum radiating out from the pylorus. These dilated or ectatic vessels result in intestinal bleeding and also give the characteristic “watermelon stomach” appearance as the the long red vascular ectasias resemble closely the markings on watermelon. The gastrointestinal manifestations of SSc are numerous and can affect the GI tract from mouth to anus. They include dental caries, Sicca syndrome, hypomotility (diffuse), gastroparesis, esophageal stricture, GERD, PUD (prednisone, NSAID), colonic pseudo-diverticula and pseudo-obstruction. Specifically, the differential diagnosis of GI bleeding in a patient with SSc should focus on peptic ulcer disease (chronic corticosteroids), GAVE, and pseudo-diverticulosis. Unfortunately, the mechanisms for the development of GAVE is not clear. GAVE has well-known associations with cirrhosis, but transjugular intrahepatic portosystemic shunting (TIPS) to resolve portal hypertension has notably not resolved GAVE, which indicates that the mechanism is not portal hypertension. A less appreciated association is that of SSc and GAVE. While GAVE is an uncommon itself, it has a significant association with SSc. In a recent large retrospective study of 264 patients with SSc found a prevalence of 5.7 % [1] In the SCOT trial (Scleroderma Cyclophosphamide Or Transplant study), where asymptomatic deSSc patients had to be screened with an endoscopy before entering the study, 10.8 % of them had silent GAVE [2]. While the vast majority (80–90 %) of patients already carry the diagnosis of SSc before GAVE manifests itself [3], it can be the initial manifestation of the disease [4,5]. GAVE is often diagnosed early in the course of the disease when presenting with symptomatic anemia. As in our patient, this typically within the first 3 years from diagnosis [6].

GOUT MIMICKING OSTEOMYELITIS Ming Zhao; Mohammad Jawish; Gerald Ryan; Michael DiSalle. Unity Hospital, Rochester Regional Health System, Rochester, NY. (Tracking ID #2193781)

LEARNING OBJECTIVE #1: Recognize the common clinical as well as radiological findings of acute gout

LEARNING OBJECTIVE #2: Distinguishing acute gout from osteomyelitis

CASE: Patient is an 86 year old female, with diagnosis of hypertension, hyperlipidemia and type II diabetes, was admitted with a 4 to 5 days history of painful and erythematous second toe of the right foot. Patient was treated for cellulitis as outpatient with oral antibiotic without any improvement. Patient denies any fever or other joint pain. No history of gout or prior similar episodes. On physical examination, her vital signs were within the normal range. Cardiovascular, respiratory and abdominal exam were normal. The second toe of right foot was severely tender and erythematous. Laboratory data revealed WBC of 10600, ESR of 66 mm/h and CRP of 1.65 mg/L. Two sets of blood cultures were negative. Plain radiography of right foot was normal. Right foot MRI was done, with radiology report showing moderate soft tissue swelling of the second digit and enhancing bone marrow edema involving the middle and distal phalanges, concerning for osteomyelitis. No tophi were identified on MRI. Patient refused joint aspiration due to severe pain. Given the MRI finding of bone marrow edema consistent with osteomyelitis, a diagnosis of second toe osteomyelitis was made and patient was started on intravenous Vancomycin and Cefepime. However, despite adequate antibiotic coverage, the patient did not respond to treatment and continued to have a severely tender and erythematous toe. Serum uric acid was checked and it turned out to be elevated at 11.3 mg/dl. Acute gouty arthritis was suspected and patient was treated with ibuprofen and colchicine. Within 24 h, the patient showed striking improvement of her symptoms. This was unusual for osteomyelitis and further supported our suspicion of gout. Antibiotics were stopped and patient was discharged. One month follow up showed no recurrence of symptoms.

DISCUSSION: Gout is the most common inflammatory arthritis in the United States and its prevalence has increased dramatically in the past several decades. Factors contributing to increased gout prevalence include the aging population, kidney disease, and changes in dietary habits. Acute gouty arthritis may be clinically difficult to distinguish from infection. The two conditions may present with similar signs and symptoms, including joint pain, swelling, erythema and sometimes systemic illness with fever, elevated WBC and ESR. Plain radiographs may be useful to distinguish gout from infection when typical

findings of gout are present, such as punched out lesions in the subchondral bone representing areas of urate deposition, or, in some patients, massive and joint-destroying tophi indicating a chronic history of gout in the past. Rarely, the expansive and destructive radiologic findings associated with gout may be mistaken for osteomyelitis and have sometimes led to erroneous amputation of involved digits. Isabelle Rousseau reported five patients with acute gout who presented with clinical as well as radiological findings mimicking septic arthritis or osteomyelitis. Two patients underwent digit amputation for not responding to antibiotic treatment and had histological findings confirming the diagnosis of gout. In our case, the initial diagnosis of osteomyelitis was made due to the MRI finding of bone marrow edema, which was concerning for osteomyelitis. However, it is also not unusual for acute gouty arthritis to present as bone marrow edema on MRI. Poh YJ have studied a total of 47 patients with gout. Fifty-three percent of the patients showed MRI finding of bone marrow edema. Other MRI features included tophi, erosions, synovitis, tenosynovitis and tendinosis. Patients suspected of acute gout should undergo arthrocentesis. The diagnosis of acute gout is most secure when supported by visualization of urate crystals under polarized microscopy in a sample of fluid aspirated from affected joint. In patients whom crystal confirmation of the diagnosis cannot be made, such as our patient who refused joint aspiration, a provisional diagnostic impression may be made on the basis of clinical criteria, as illustrated by American College of Rheumatology criteria for the classification of gout, including history, physical examination, laboratory tests and imaging studies. A quick and striking improvement to empirical treatment of gout may also argue against infection and help with differential diagnosis. Appropriate diagnosis of gout, as demonstrated in our case, results in different and definitive treatment choices, and spares the patient from further unnecessary antibiotic therapy or surgery. Thus, it is important for the internist and the radiologist to be aware of the radiological manifestations of acute gout that can resemble infection in order to avoid inappropriate diagnosis and delay in adequate treatment.

GREEN SPUTUM IN PRIMARY SCLEROSING CHOLANGITIS Gwen Thompson; Douglas A. Simonetto; William Sanchez. Mayo Clinic, Rochester, MN. (Tracking ID #2197978)

LEARNING OBJECTIVE #1: Recognize bronchobiliary fistula as a cause of chronic cough in patients with biliary obstruction.

LEARNING OBJECTIVE #2: Diagnose and manage bronchobiliary fistulas. **CASE:** A 44-year-old Caucasian female with a history of primary sclerosing cholangitis-autoimmune hepatitis overlap presented with a chronic productive cough of 4 months duration. The patient was initially diagnosed with *Escherichia coli* bacteremia and pneumonia secondary to ascending cholangitis 4 months prior to presentation. At that time an endoscopic retrograde cholangiopancreatogram (ERCP) was completed that demonstrated a large amount of debris and purulent material in the intra- and extrahepatic biliary trees with multiple strictures. Bilateral biliary stents were placed at this time. Despite appropriate antibiotic therapy, the patient continued to have a chronic cough. Her sputum production continued to increase and changed in coloration from yellow to green six weeks prior to presentation. During this time course, the patient was treated with multiple courses of antibiotics as an outpatient with no improvement. The patient was admitted for inpatient evaluation and treatment. Review of systems was significant for chronic cough, occasional night sweats, generalized fatigue and musculoskeletal chest pain. Remainder of review of systems including hemoptysis, weight loss, fevers, and chills was unremarkable. Physical exam revealed tachycardia with a pulse of 109 and bilateral coarse breath sounds throughout. Suction was used to measure the patient's sputum production which ranged from 200 to 1100 mL per day. Remainder of physical exam was unremarkable. Laboratory results revealed an elevation of total bilirubin at 3.2 mg/dL (reference range <1.2 mg/dL). All other laboratory results including transaminases were within normal limits. Chest x-ray was completed and revealed bronchial thickening and right lower lobe consolidation with a small pleural effusion. Bronchoscopy was performed and revealed copious bile-stained secretions. Cultures from bronchoscopy grew *Pseudomonas* and *Citrobacter*. An esophagram was negative for a tracheoesophageal fistula. The patient was started on piperacillin-tazobactam for presumed *Pseudomonas aeruginosa* pneumonia with no improvement. CT abdomen was performed that showed evidence of a bronchobiliary fistula. ERCP was completed that demonstrated a bile leak from the right anterior hepatic duct into a collection above the diaphragm. Biliary stents were placed. Post-procedure, the patient progressively improved.

DISCUSSION: Bronchobiliary fistula is a rare condition, usually resultant of hepatic malignancies or bile duct obstruction from cholangiolithiasis, chronic pancreatitis, or postoperative stricture. Other rare causes include trauma or hepatic infections such as abscess or hydatidosis. Biliaryitis is pathognomonic for bronchobiliary fistula and is usually present in copious volumes from 200 to 1200 mL daily. The growth of *Pseudomonas* in our patient's bronchoalveolar lavage delayed our diagnosis as this was initially thought to be the cause for the noted green sputum. Diagnosis can be confirmed by ERCP, magnetic resonance cholangiopancreatography (MRCP) or hepatobiliary imino-diacetic

acid (HIDA) scan. Although the latter two are noninvasive alternatives, ERCP also provides therapeutic opportunities and may be a preferred option if suspicion is high. Management includes endoscopic or percutaneous drainage versus surgery. With the advance of less invasive procedures, surgery has been typically reserved for refractory cases or when the fistula is a result of a potentially resectable tumor. The majority of patients with bronchobiliary fistulas recover after appropriate management. Without management, significant morbidity can occur from severe chronic cough and electrolyte disturbances secondary to large volume bile loss. Hence, increased awareness and early recognition is important.

GROUP A STREPTOCOCCAL SEPTIC ARTHRITIS Julia Manasson¹; Hannah Kirsch¹; Vanessa Charubhumi¹; Ann Garment¹; Taiye Odedosu². ¹New York University School of Medicine, New York, NY; ²NYU Medical Center, New York, NY. (Tracking ID #2175644)

LEARNING OBJECTIVE #1: Recognize the specific features of Group A streptococcal septic arthritis, a rare causative organism for joint infection.

CASE: A 44 year-old woman with a history of untreated rheumatoid arthritis initially presented to an outpatient gynecologist with several days of vaginal discharge and itching, which was diagnosed as bacterial vaginosis. Examination revealed a small excoriation on her labia. The following day, she experienced fevers, chills, headache, and malaise. She presented to the emergency room, where she had a temperature of 104.3 F. Labs were remarkable for leukocytosis of 12.1 10⁹/L (95.4 % neutrophils, 8 bands). Blood cultures were drawn. Urinalysis, chest X-ray, and lumbar puncture were inconsistent with infection. The patient was diagnosed with likely influenza despite a negative nasal swab and discharged to home. That night she developed new excruciating left elbow pain. Concurrently, her blood cultures grew out gram-positive cocci in pairs and chains, and she was immediately recalled for admission to the hospital. The patient was febrile, tachycardic, and now hypotensive to 85/55. Her exam was notable for a clear oropharynx, no lymphadenopathy, no murmurs, mild bibasilar crackles, and a swollen, extremely tender left elbow with poor range of motion. A new set of labs revealed a lactate of 2.9 mmol/L and c-reactive protein (CRP) of 200 mg/L. A left elbow X-ray showed extensive joint erosion and joint space narrowing. Joint fluid analysis was significant for 288,000 WBC/mm³ (90 % neutrophils) without crystals. The patient was diagnosed with severe sepsis from gram-positive bacteremia and septic arthritis presumably from hematogenous seeding. She was initially treated with fluid resuscitation, vancomycin and piperacillin-tazobactam, and a prompt joint washout by orthopedics on hospital day two. Subsequent echocardiography ruled out endocarditis. Blood and joint fluid cultures eventually speciated to Group A streptococcus (GAS), the most likely source thought to be skin flora that entered the blood through the patient's labial excoriation. She was placed on penicillin G and clindamycin for antibiotic synergy. Within days she made a rapid recovery and was continued on intravenous antibiotics for a total of two weeks, followed by a prolonged oral course.

DISCUSSION: Septic arthritis is a rheumatologic emergency that can lead to rapid joint destruction. This case demonstrates a rare type of septic arthritis caused by GAS. Few such cases are described in the literature, but this one demonstrates several typical features, including portal of entry through a skin lesion, infection associated with severe systemic symptoms, and predilection for young women. Early recognition even of rare causative bacteria is crucial for rapid initiation of appropriate therapy to prevent joint destruction and further spread of infection.

GUM SHOCK: PREVENTABLE ORAL DISEASE CAUSING SEPTIC SHOCK IN A YOUNG ADULT WITH TYPE 1 DIABETES Matthew R. Augustine; Rachel Appelblatt; Mack Lipkin; Kathleen Hanley. New York University Medical Center, New York, NY. (Tracking ID #2198957)

LEARNING OBJECTIVE #1: Recognize dental infection as plausible source for systemic infection

LEARNING OBJECTIVE #2: Identify the gaps in oral health care and importance for physician-led preventative services

CASE: A 22-year old man was brought into the emergency department (ED) after collapsing. The patient had a history of type 1 diabetes mellitus with hemoglobin A1c of 9.7 %. For 1 week prior to presentation, he reported progressive right upper maxillary oral pain focal to teeth and gingiva. He denied prior fevers, chills, night sweats and other symptoms of localizing infection. Oral pain prompted the patient to present to urgent care of dental clinic. While awaiting therapy, he experienced syncope. In the ED, the patient's temperature was 104.0 F; pulse, 160 beats per minute; respiratory rate, 26 breaths per minute; and blood pressure (BP), 100/64 mmHg. The patient was agitated with an altered mental status (AMS) and multiple additional signs of

end-organ hypoperfusion, including lactic acidosis (venous lactate 4.4 mmol/L) and acute kidney injury. Oral examination revealed diffuse periodontal disease with induration of right upper maxillary soft tissue without overt purulence or fluctuance. Facial computer tomography showed asymmetric, right paranasal and premolar soft tissue swelling without fracture or invasion of cranial structures. The patient became somnolent and hypotensive (BP 89/44). Despite seven total liters of crystalloid and empiric antibiotics (vancomycin and cefepime), hypotension, tachycardia, AMS, and lactic acidosis persisted. Norepinephrine was initiated, and the patient was admitted to Medical Intensive Care Unit for septic shock. Given his suspected oral source, piperacillin/tazobactam was given for expanded coverage of oral anaerobic organisms. Within 12 h, the patient's hemodynamics improved, mental status returned and lactic acidosis resolved. Norepinephrine was discontinued. On hospital day 2, oral exam revealed increased swelling with new overt right frontal maxillary fluctuance and purulent drainage. Oral-maxillofacial surgery incised and drained a periapical abscess. On hospital day 3, patient was discharged on oral amoxicillin-clavulanic acid with dental follow-up for definitive endodontic treatment.

DISCUSSION: This rare etiology of septic shock highlights a potential risk of inadequate access to oral care. Dental caries, severe periodontal disease, and progression to oral abscess are preventable infections with serious systemic consequences. Without oral hygiene and routine care, dental caries progress to involve the dental root, or apex, and surrounding soft tissue, leading to cellulitis and abscess formation. Acute management includes incision and drainage with systemic antibiotics, targeted to oral streptococcal and anaerobic organisms, followed by definitive therapy with root canal or extraction. Optimal oral health services for at-risk populations are limited by access, physician training, and care coordination. Oral disease disproportionately affects minority and vulnerable populations and is more severe amongst patients with diabetes and other co-morbidities. The restriction of Medicaid coverage for adult dental care has led to decreased routine care and increased rates of unmet dental needs. As a result, more patients, mostly 18–49 years old, present with oral complaints to emergency departments and ambulatory medical care sites. Physicians lack formal training. National guidelines lack direct recommendations on oral health care. Physicians resort to providing bridge therapy with antibiotics and narcotic medication, and patients are left without definitive therapy from an oral health professional. Severe cases of oral cellulitis or abscess formation results in nearly 8000 admissions and \$100 million in costs each year. This case highlights the rare yet avoidable and costly consequences of preventable oral disease. Early counseling, oral examination, and recognition by this patient's physician may have led to an earlier referral to routine dental care and avoidance of this severe complication. Enhanced integration of oral health care into physician training and advocacy for policies to improve access and collaboration might potentially provide comprehensive care, improve quality of life, and reduce costs.

HARBINGER OF BAD NEWS: RASHES AS PRESENTING FEATURE FOR NEWLY DIAGNOSED HIV IN A PATIENT WITH NO SELF-REPORTED RISK FACTORS. Andrew Trifan. University of Pittsburgh, Pittsburgh, PA. (*Tracking ID #2196782*)

LEARNING OBJECTIVE #1: Recognize the association of key rashes with underlying HIV infection.

LEARNING OBJECTIVE #2: Illustrate the importance of clinical intuition regarding screening for HIV in patients who report no risk factors, especially in a new patient visit.

CASE: A 50 year old man with no past medical history presented to the office with complaints of several rashes over the last few weeks. He was in his usual state of health till 2 months prior when he developed a pruritic erythematous scaling rash on his scalp. A few days later he noticed a non-scaling erythematous rash in his axilla/intertriginous region that was even more pruritic than his scalp. A week prior to arrival in the office he developed an intense sharp pain in his left arm that within 2 days had multiple vesicular lesions, diagnosed at the ED as shingles and discharged to follow up with a PCP, whom he had not seen in 20 years. On arrival for our first visit, he was afebrile and hemodynamically stable. Physical exam showed seborrheic dermatitis on the scalp, candida infection in skin folds, and vesicular lesions in a dermatomal distribution that were crusting over. Review of systems was unremarkable except for a 10 lb weight loss over last few months. He had no known allergies, no recent illness or stressors at home and no history of rashes as a child. He was sexually active with one female partner of 6 years and used condoms consistently. There was no prior history of STI or drug use but he did admit to having a minimum of 15 drinks/week. He stated he was checked for HIV a few years ago at an urgent care for his work and was negative. With his multitude of rashes, concern for immunosuppression was high and a repeat HIV was ordered. It returned positive with a CD4 count of 50 and viral load of 20,000. After discussing the results with him at our next visit, he acknowledged that he had omitted several key aspects of his social history because he was ashamed. He noted that his current partner was an IV drug user, that he did not practice safe sex consistently, had been with another woman in last few years, and

that the mother of his 8 year old daughter was HIV positive (though child herself was not). Counseling was given and he was referred to our HIV specialist clinic to begin treatment.

DISCUSSION: It is estimated that roughly 20 % of individuals with HIV in America are unaware of their diagnosis. HIV can present in a variety of ways based on the duration and control of the disease. One presentation is the development of common rashes in unusual situations. Seborrheic dermatitis and candidal infections, while common in children and adolescents, are quite rare to be newly diagnosed in adults, especially if there is no prior history of dermatitis. Both rashes, however, have high prevalence rates in HIV positive individuals. Coupled with shingles in a young patient with no other pertinent history, one should remember that a myriad of new onset rashes signals the need for further work up, including checking or rechecking for HIV. It is also important to keep in mind that patients may not fully disclose their risk factors, especially in the first meeting with a new doctor. A hazardous drinking level increased the concern for other risky behaviors and was another reason his HIV status was checked. Once the diagnosis is made the provider should proceed with further investigation to identify any contributing risk factors. HIV education was provided to the patient, including the importance of disclosure to partners, consistent use of barrier methods to decrease transmission, and awareness that risk of transmission persists even with undetectable viral levels. This case demonstrates that HIV does not always present with rare physical exam findings, and that a common disorder in an unusual setting may be enough to warrant a further work up. This case also shows that patients may not always reveal, consciously or not, risk factors when asked for variety of reasons, such as embarrassment. Finally, whether the diagnosis is confirmed or not, patients in clinic who are deemed to be at high risk or engaging in high risk behavior should be counseled on preventative measures. This will help serve as a way to not only decrease risk of acquisition but also disease transmission.

HAVING A ROAD BLOCK: WHEN TO SUSPECT POLYCYTHEMIA VERA
Maria M. Zlobinsky Rubinstein; Sheira Schlair. Montefiore Medical Center, New York, NY. (*Tracking ID #2195030*)

LEARNING OBJECTIVE #1: Understand erythrocytosis evaluation

LEARNING OBJECTIVE #2: Recognize clinical and hematological features of Polycythemia Vera (PV)

CASE: A 36 year old man presented with new onset blurry vision and jaw claudication associated with headaches. Initially, the headaches were mild, but then intensified with the development of blurred peripheral vision, photophobia, and then complete opacification of vision. Additionally, he also reported a one year history of progressive paresthesias which he described as “bugs crawling” on the right side of his lower face, and intermittent vertigo. He reported facial asymmetry, decreased sensation, intermittent jaw pain and weakness on the right side of his face. On review of systems he reported fatigue, joint pains, stiffness and pruritis (no rash). Extraocular movements were intact, and pupils were symmetrical, round and reactive. He had decreased sensation on the right side of his face in the V1-V3 distribution, and decreased motor strength in the V2-V3 distribution with visible atrophy. The rest of his neurological, cardiac and pulmonary exams were within normal limits. Basic metabolic panel and liver function tests were within normal limits. Complete blood count showed hemoglobin of 20.0 g/dL (normal range: 15–17.4 g/dL). Platelets were 405 g/dL and white blood cell count was within normal limits. Iron studies were unremarkable. Further evaluation of erythrocytosis revealed a markedly decreased erythropoietin level at 0.4 U/L, and a positive Janus family tyrosine kinase (JAK2) mutation. MRI of the brain was unremarkable and ultrasound revealed splenomegaly. He was diagnosed with PV and underwent immediate therapeutic phlebotomy. After five sessions of therapeutic phlebotomy his hemoglobin stabilized to 15.2 g/dL. Low dose aspirin was prescribed and the patient reported almost immediate resolution of his headaches and pruritis and restoration of vision.

DISCUSSION: Regardless of the presence or absence of symptoms, the incidental finding of polycythemia warrants evaluation. Men with hemoglobin of greater than 18.5 g/dL and women with hemoglobin of greater than 16.5 g/dL should undergo further testing. Initial testing with erythropoietin aims to distinguish between primary and secondary polycythemia. Elevated erythropoietin levels are consistent with secondary polycythemia, most commonly caused by hypoxic disease states. If erythropoietin levels are decreased, a JAK2 mutation is ordered. A positive JAK2V617F mutation confirms the diagnosis of PV. Frequently, PV is diagnosed by routine blood work in asymptomatic individuals and symptoms tend to develop gradually due to blood hyperviscosity. PV has a relatively low prevalence of approximately 22 patients per 100,000. It is a clonal stem cell disorder that results in overproduction of erythrocytes and frequently overproduction of leukocytes and platelets. PV was first described as part of spectrum of myeloproliferative disorders, and more recently has been identified with a single acquired mutation of the JAK2. JAK2 is a mandatory tyrosine kinase for erythropoietin and thrombopoietin receptors. More than 95 % of patients with PV express JAK2V617F, essentially confirming the diagnosis. PV should be suspected in patients found to have polycythemia and present with transient neurologic symptoms, headache and visual changes, as in the

case of this patient. Also akin to our patient, patients with PV frequently report paresthesias and/or pruritis. Splenomegaly and portal vein thrombosis should raise the suspicion of PV regardless of other symptoms since the increased blood viscosity can also increase risk of thrombosis. Similarly, PV should be suspected in patients with polycythemia and have evidence of thromboses, including cerebrovascular events, transient ischemic attacks and splenic infarction. According to the World Health Organization (WHO), a diagnosis consists of hemoglobin greater than 18.5 g/dL in men (16.5 g/dL in women) or elevated red cell mass greater than 25 % above normal predicted value with a Jak2 mutation. Minor criteria include: bone marrow biopsy with hypercellularity, serum erythropoietin levels below normal range or endogenous erythroid colony formation in vitro. The natural history of PV is generally insidious and can vary among individuals. It rarely progresses to acute myeloid leukemia and myelofibrosis. The treatment aims to maintain hematocrit under 45 % in men and 42 % in women. Therapeutic phlebotomy is considered the first line treatment and is extremely effective at rapidly reducing symptom burden, as in the case of our patient. Aspirin is prescribed to reduce the risk of thrombosis. In addition, hydroxyurea or interferon can be used to suppress bone marrow production of erythrocyte precursors. Our patient continues to tolerate phlebotomy. He has experienced improvement in his red blood cell counts and had clinical resolution of his symptoms associated with hyperviscosity.

HEARTBROKEN: CARDIAC REJECTION MASQUERADING AS AN ST-ELEVATION MYOCARDIAL INFARCTION. Peter P. Vlismas; Pedro Villablanca; Andrew Krumerman; Snehal Patel; J. Julia Shin; Ulrich P. Jorde; Daniel B. Sims. Montefiore Medical Center, Bronx, NY. (Tracking ID #2198887)

LEARNING OBJECTIVE #1: Recognize alternate causes of ST-elevation other than myocardial infarction

CASE: A 74 year-old male with chronic heart failure due to an ischemic cardiomyopathy who underwent heart transplantation five years previously presented with left sided chest pain of four days duration. Associated symptoms included dyspnea on exertion, fatigue, orthopnea, paroxysmal nocturnal dyspnea, and nausea. The past medical history was notable for an episode of acute cellular rejection four years prior to admission. The patient's medications included aspirin, rosuvastatin, clonidine and a two-drug immunosuppression regimen consisting of tacrolimus and mycophenolate mofetil. On presentation, the patient's blood pressure was 150/86 mm Hg, heart rate 106 beats/minute, and respiratory rate 30 breaths/minute. He was afebrile. Physical exam was remarkable for jugular venous distension, bibasilar crackles, and 1+ bilateral LE edema. Electrocardiogram (ECG) revealed sinus tachycardia with ST-segment elevations in leads I and aVL with reciprocal changes in the inferior leads consistent with a lateral myocardial infarction. The patient was taken for emergent coronary angiography which revealed no obstructive coronary lesions. Echocardiogram obtained in the cardiac catheterization lab revealed a left ventricular ejection fraction of 25 % and severe right ventricular dysfunction. A right heart catheterization performed while the patient was receiving dobutamine infusion showed severely elevated biventricular filling pressures and low cardiac index. An endomyocardial biopsy was performed. Laboratory analysis sent off in the emergency department returned a CPK of 983 U/L, troponin T 1.28 ng/mL, pro-BNP 146,128 pg/mL, potassium 5.0 mEq/L, creatinine 5.0 mg/dL, AST 2676 U/L, and ALT 1911 U/L. The patient was diagnosed with cardiogenic shock resulting in renal and hepatic failure. He was empirically started on intravenous methylprednisolone because of suspicion for acute allograft rejection. Blood pressure declined and he required vasopressor support in addition to inotropic support. He was started on continuous renal replacement therapy. Tacrolimus level returned undetectable. The endomyocardial biopsy revealed both severe acute cellular and antibody-mediated rejection. The patient was started on cytolytic therapy with thymoglobulin for cellular rejection. He received intravenous immunoglobulin and plasmapheresis to treat the antibody-mediated rejection. ST-elevation resolved on hospital day #5. Repeat endomyocardial biopsy on hospital day #12 showed resolved cellular rejection with minimal evidence of antibody-mediated rejection. Echocardiogram that day showed minimal improvement in function. Repeat echocardiogram on hospital day #23 showed normalized biventricular function.

DISCUSSION: Acute allograft rejection is a major cause of early mortality after heart transplantation. Cellular rejection, mediated by a T lymphocyte response to the allograft tissue, is the most common form of rejection in heart transplant recipients. Antibody-mediated rejection occurs due to antibody fixation and activation of the complement cascade resulting in tissue injury. Although acute rejection is a common complication post-heart transplantation, ST-elevation has not been associated with rejection. Review of the literature reveals only one case report of a patient 2 weeks post-heart transplantation that developed ST-elevation on the ECG. Autopsy revealed acute cellular rejection. ECG findings commonly seen with rejection are low QRS voltage and atrial flutter or atrial fibrillation. While low QRS voltage during severe rejection has been explained by edema between the myocytes, the mechanism of ST-elevation has not been elucidated. We surmise that intense inflammation caused by the combined cellular and antibody-

mediated rejection led to an injury current and ST-elevation manifest on the ECG. Heart transplant patients can develop ST-elevation, however this often occurs in the setting of a myocardial infarction due to coronary allograft vasculopathy (CAV), also called transplant coronary artery disease. CAV is an immune-mediated process involving smooth muscle hyperplasia characterized by diffuse, concentric proliferation rather than the focal, eccentric lesions of coronary atherosclerosis. Other conditions such as left ventricular hypertrophy, early repolarization, hyperkalemia, myocarditis, pericarditis, coronary vasospasm, and pulmonary embolism can all present with ST-elevations mimicking myocardial infarction. In conclusion this is the first case to our knowledge of mixed cellular and antibody-mediated rejection presenting with ST-elevation. It exemplifies the difficulty of rapid and accurate diagnosis of the etiology of acute ST-elevation. Our case highlights the need for awareness of this rare ECG manifestation in transplant recipients and the importance of recognizing imitators of acute myocardial infarction presenting with ST-elevation.

HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS SECONDARY TO MILIARY TUBERCULOSIS Puja D. Chokshi¹; Anjani Pilarisetty¹; Allan- Louie E. Cruz²; Kelly W. Fitzpatrick². ¹Washington Hospital Center, District of Columbia, WA; ²Washington Hospital Center, Washington, DC. (Tracking ID #2199238)

LEARNING OBJECTIVE #1: Recognize Tuberculosis as an underlying cause to developing hemophagocytic lymphohistiocytosis.

LEARNING OBJECTIVE #2: Diagnose Miliary Tuberculosis from radiographic imaging.

CASE: A 37 year old African female with no past medical history presented to the emergency department (ED) with fever and left flank pain. Initial workup done in the ED was unremarkable and patient was sent home with pain medications and ciprofloxacin for a presumptive UTI. When she did not improve, PCP recommended she return to the ED where she was admitted for fever, new unexplained thrombocytopenia, and an enlarged spleen on CT of the abdomen. She has no past medical history, no surgeries, and was not a smoker or alcohol user. At the time of presentation, vitals were temperature 38.9 C, heart rate 92, respiratory rate 20, blood pressure 127 mmHg /DysBP 58 mmHg, O2 Sat 99 % on room air and physical exam was only remarkable for left hand ecchymosis. Her initial blood work was significant for platelets of 57, Na of 132, AST of 165, ALT of 196, and albumin of 2.8. UA was unremarkable and CXR was read as unremarkable. Patient was thought to have a viral infection and was admitted to the regular medicine floors to be managed with supportive care. However, on the second day of hospitalization, she developed increased work of breathing and was intubated for airway protection and transferred to the MICU. Hematology was consulted for new thrombocytopenia with transaminitis. Infectious disease was consulted for persistent fever. Numerous tests were ordered for further evaluation including a hepatitis panel, HIV, CMV, Malaria smear, AFB smears, EBV, parvovirus B19, urine Streptococcus antigen, urine Legionella antigen, C-ANCA, P-ANCA, serum and urine protein electrophoresis, and ANA titer which all returned negative. Bronchoscopy was performed and bronchoalveolar lavage (BAL) was sent out for cultures. After hematological evaluation, patient was also found to have an elevated ferritin (1899), low fibrinogen (180), and elevated triglycerides (500) worrisome for hemophagocytic lymphohistiocytosis (HLH). Bone marrow confirmed HLH showing multiple histiocytes with hemophagocytes. Thought to be the primary etiology, she was started on HLH 2004 chemotherapy protocol with Etoposide 150 mg/m² twice a week for 2 weeks, Dexamethasone 10 mg/m² every day for 2 weeks, cyclosporine 275 mg PO 2x/day. Her bone marrow was successfully suppressed only to have the BAL cultures return 3 weeks later, positive for tuberculosis (TB). Once TB diagnosis was made, chemotherapy was stopped and steroids were tapered. She was then started on Rifampin, Isoniazid, Pyrazinamide, and Ethambutol and slowly showed clinical improvement.

DISCUSSION: Primary HLH, also called familial hemophagocytic lymphohistiocytosis (FHL), refers to HLH caused by a gene mutation, often inherited. The mutation is either at one of the FLH loci or in a gene responsible for one of several immunodeficiency syndromes. Cells of the immune system do not work properly to destroy infected or damaged cells as they should causing the immune system to become over activated which then leads to the body damaging its own tissues and organs. However, HLH can also be acquired or be secondary to an underlying process such as an infection, an autoimmune disorder, or a malignancy. TB can lead to HLH but is often not seen in the developed world. Miliary TB is especially uncommon in the developed world and due to its vague and varied presentation, and negative initial testing such as AFB smears, is often forgotten in the differential. However, it needs to be promptly recognized since it is almost always fatal when left untreated. The first clue is often radiographic imaging but without clinical correlation it can easily be missed in the early stages. Therefore it is important to review these images as internal medicine physicians to help raise concern when the clinical symptoms are not fitting with the more common illnesses. There have been case reports demonstrating the link between TB and HLH but this is unique to show this manifestation in an immunocompetent patient in the developed world. It is important for

internal medicine physicians to recognize both TB and HLH and understand the link between the two.

HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS: A SYNDROME OF PATHOLOGIC INFLAMMATION David Kudlowitz¹; Ping Gu¹; Alana Sigmund². ¹NYU, New York, NY; ²NYULMC, New York, NY. (Tracking ID #2162177)

LEARNING OBJECTIVE #1: To be able to diagnose hemophagocytic lymphohistiocytosis.

LEARNING OBJECTIVE #2: To be able to describe the pathophysiology of hemophagocytic lymphohistiocytosis.

CASE: This is a 41-year-old man with no past medical history who was referred by his provider to the inpatient setting with an enlarged left external iliac lymph node in the setting of 40-lb weight loss over 3 months and generalized fatigue. On admission, the patient's vital signs were: T103°F, HR 150, BP 90/60, Saturation 99 % on room air. His exam was significant for a dry, scaly rash on the scalp, bilateral legs, flanks, buttock, and arms with reticular erythema on bilateral flanks. Lab data was notable for hemoglobin of 8.4 grams/deciliter and platelets of 94,000 per microliter. Due to hemodynamic instability, the patient was evaluated for sepsis and pulmonary embolism, with a pulmonary embolism noted on computed tomography with contrast. Bone marrow biopsy showed macrophages with hemophagocytosis. Other notable labs included fasting triglycerides 334 and ferritin 6850. Skin biopsy confirmed acquired ichthyosis, likely a paraneoplastic reaction. Lymph node biopsy pathology confirmed ALK-1 Negative Anaplastic Large Cell Lymphoma. Of note, his entire infectious work up (including EBV) was negative and antibiotics were discontinued. He was treated with four cycles of Hyper-CVAD with complete remission (and improvement in his rash). Additionally, he underwent autologous stem cell transplant and is currently doing well more than 100 days post-transplant.

DISCUSSION: Hemophagocytic lymphohistiocytosis (HLH) was first recognized as a genetic disorder in 1952, at that time named “familial hemophagocytic reticulosis”. Now, there are two classifications of HLH, genetic and acquired. Acquired HLH is triggered by an entity that leads to decreased cytotoxic immune activity and uncontrolled immune hyperactivation. Examples of these triggers include infectious (viral, bacterial, fungal, or parasitic), rheumatologic (commonly referred to as Macrophage Activation Syndrome) and malignancy (mostly hematologic). In addition to dysregulated immune function, partial or completely defective Natural Killer Cells (NKC) or Cytotoxic T Cells (CTL) lead to an immunodeficiency. Also, immunopathology at the tissue level is usually evident (hemophagocytosis, cytopenia) as it was in this case. The diagnostic guidelines for this clinical syndrome were edited in 2004. These criteria are markers of pathologic inflammation (Table 1). Our patient met 5/8 criteria: fever, cytopenia, phagocytosis, elevated ferritin, and hypertriglyceridemia. sCD25 and NK-cell activity were not tested. Interestingly, HLH shares many laboratory and histologic similarities with sepsis. Both likely appear on a spectrum of pathologic immune response, presenting a challenge for the diagnosing clinician. However, it is important to make the diagnosis of HLH as it would drastically alter treatment options. HLH, when associated with malignancy, is most commonly seen with lymphoma. Our patient was diagnosed with anaplastic large cell B-cell lymphoma. In a single institution study from France, of 50 consecutive children with ALCL, 12 % had HLH and there was no difference in mortality between the two groups. Generally, lymphomas that trigger HLH have a poor prognosis, but B-cell lymphomas fare better than T cell lymphomas in this clinical situation. The treatment for this disease mostly is primarily focused on treating the underlying process, however, there may be some role for controlling the initial cytokine storm with plasmapheresis, as seen in several case reports.

HEMORRHAGIC PANCREATIC PSEUDOCYST—BLOOD WEEPING PSEUDOCYST WITH FISTULIZATION, AN UNCOMMON COMPLICATION OF PANCREATIC PSEUDOCYST Dilpreet K. Singh; Dr. Mini Hariharan; Dr. Jasdeep S. Badwal; Dr. Mary Jo Farmer. Baystate Medical Center/Tufts School of Medicine, Springfield, MA. (Tracking ID #2190507)

LEARNING OBJECTIVE #1: Recognize complications of a pancreatic pseudocyst.

LEARNING OBJECTIVE #2: Manage a patient with complicated pancreatic pseudocyst in septic shock with transarterial embolization and cystogastrostomy.

CASE: A 59 year old male with a medical history significant for oliguric end stage renal disease (ESRD) secondary to atypical hemolytic uremic syndrome on hemodialysis and eculizumab therapy, infrarenal abdominal aortic aneurysm, hypertension, dilated cardiomyopathy, congestive heart failure, liver cirrhosis, alcohol abuse history and a known pancreatic pseudocyst (7.8 cm 2 months prior to admission) presented from a skilled nursing facility with a 3 day history of abdominal pain, chest pain, nausea, and vomiting after missing his hemodialysis session. On admission, he was hypotensive, mildly tachycardic and hypothermic. The patient was ill appearing, cachectic, with a soft

abdomen and diffuse tenderness but no peritoneal signs. An electrocardiogram revealed normal sinus rhythm, hyperacute T-waves in V2-V3, and ST depressions in V4-V6. Laboratory findings were significant for leukocytosis with a left shift, anemia, an elevated lipase, and lactic acidosis. An abdominal computed tomography (CT) revealed a heterogeneous complex hemorrhagic cystic mass (15.5 cm×13.9 cm) in the pancreas. The patient was fluid resuscitated and received DDAVP, blood transfusions, IV antibiotics, and was transferred to the ICU. An abdominal CT angiogram (CTA) did not reveal active extravasation; therefore, arterial embolization was not pursued. Surgery deemed the patient a poor surgical candidate and did not offer emergent intervention. He was managed supportively with serial hemoglobin and hematocrit levels, transfusions as needed, pain control, nutritional support, and ESRD management. Repeat CTA demonstrated continued hemorrhage into the pancreatic cyst for which prophylactic splenic artery embolization was performed. Repeat abdominal CT scan revealed an interval increase in size of the pseudocyst now compressing the stomach, liver, and duodenum for which endoscopic cystogastrostomy with placement of two pigtail stents was performed. Antibiotics were begun for a suspected infected pseudocyst. A follow-up abdominal CT revealed spontaneous fistulization of the pseudocyst into the stomach for which the patient underwent ERCP revealing a gastric ulcer with spontaneous perforation into the pseudocyst cavity. The patient was discharged to rehab in stable condition with surgical outpatient follow-up for a semi-elective distal pancreatectomy and splenectomy, and repeat ERCP for removal of the cystogastrostomy stents.

DISCUSSION: Pancreatic hemorrhage arising from a pancreatic pseudocyst is a rare complication with incidence ranging from 1.4 to 8.4 %. Mortality rates can reach as high as 40 %. Indications for surgical intervention of large pancreatic pseudocysts include no regression after six weeks of observation, increase in size greater than 6 cm, cyst wall maturity, and development of symptoms. Chronic pancreatic pseudocysts rarely regress after six weeks if larger than 6 cm and have an increased risk of complications such as hemorrhagic conversion as in our patient's case. With his known pancreatic pseudocyst, our patient could have benefitted from surgical intervention 2 months prior. However, with his current presentation surgery was not an immediate option given the high mortality risk and risk of uncontrolled bleeding. Transarterial embolization is a minimally invasive, non-surgical and effective treatment for controlling hemorrhage in patients with pseudocysts. Embolization involving occlusion of the hemorrhaging vessel with platinum coils or gelatin sponges is a potential treatment option for the management of arterial bleeding. The inability to demonstrate the culprit vessel on CTA imaging in our patient necessitated a prophylactic embolization of the splenic artery as a targeted approach could not be achieved to treat the persistently hemorrhaging pseudocyst. As a result, our patient was managed with placement of an endoscopic cystogastrostomy with the creation of a fistula and stent insertion between the pseudocyst and the stomach. This procedure is associated with a treatment success rate of 89–100 % and a mortality rate of less than 1 %. Rupture of a pseudocyst into the peritoneal cavity, biliary tract, and as in our case into the GI tract is a very uncommon complication of hemorrhagic pseudocyst. This case demonstrates the complications that arise from pancreatic pseudocyst as well as various management strategies.

HENOCH-SCHONLEIN PURPURA IN AN ADULT Stephen C. Chow; Sarah Kuhn. Carolinas Medical Center, Charlotte, NC. (Tracking ID #2197757)

LEARNING OBJECTIVE #1: Describe a severe presentation of HSP in an adult, a syndrome more commonly seen in children.

LEARNING OBJECTIVE #2: Increase clinical suspicion of HSP in adults in hopes that earlier identification and treatment will improve clinical outcomes.

CASE: A 66-year-old Caucasian female with a history of Sjogren's disease, chronic obstructive pulmonary disease, mild chronic kidney disease, and diabetes mellitus type 2 presented with a rash that began 2 days prior to arrival. The rash initially began as an intensely pruritic, dark red to purple lesions that appeared on her feet bilaterally which then coalesced. The patient decided to come to the hospital after she noticed the rash appearing on her hands and spreading up to her upper arms. She was on azithromycin 2 weeks prior for acute bronchitis but otherwise denied any new medications or environmental exposures. She complained of diffuse joint pain but no abdominal pain. Her daughter felt she was more confused than her baseline. Physical exam revealed a chronically ill appearing female in no acute distress. Mucous membranes were moist with no xerostomia or keratoconjunctivitis sicca. There was a diffuse palpable purpuric rash on the anterior lower extremities involving the dorsum and plantar surfaces of both feet. There were also coalesced areas on the dorsum and palmar surfaces of her hands and upper arms. She was alert and oriented. Initial laboratory evaluation revealed creatinine of 2.21 mg/dL elevated from baseline of 1.1 mg/dL and blood urea nitrogen (BUN) of 45 mg/dL. Sedimentation rate and C-reactive protein levels were both within normal limits. Urinalysis was significant for over 100 red blood cells and white blood cells per high-powered field, large leukocyte esterase, and many bacteria. Rheumatology workup ruled out autoimmune processes including antinuclear antibody, anti-double stranded DNA, Sjogren's SS A and SS B, rheumatoid factor, and anti-neutrophil cytoplasmic antibody. Hepatitis panel

was negative, and ammonia level was normal. Antibody levels were obtained which showed IgA level of 711 mg/dL. A punch biopsy of one of her skin lesions showed leukocytoclastic vasculitis. She was started on prednisone 60 mg with some improvement in her rashes, but then she began to have increasing episodes of confusion with rising BUN up to 72 mg/dL and creatinine to 4.39 mg/dL. Nephrology initiated the patient on hemodialysis on hospital day #8. She also developed pancytopenia with white blood cell count dropping to 1.8 K/uL, hemoglobin 7.3 gm/dL, and platelets 57 K/uL. Renal biopsy was performed which was consistent with IgA nephropathy but no crescents were seen. Repeat skin biopsy showed IgA deposition in the cutaneous vasculature likely consistent with Henoch-Schönlein purpura (HSP). The patient was continued on prednisone for a total of 4 weeks. Immunosuppressants were not initiated given her pancytopenia. The patient's rash did show improvement with steroids, and her mental status improved with hemodialysis. Unfortunately, she did not show any evidence of renal recovery at the time of transfer to long-term acute care center and was continued on dialysis.

DISCUSSION: Henoch-Schönlein Purpura (HSP) is typically thought of as a pediatric syndrome and is the most common pediatric vasculitis affecting the skin. The joints, gastrointestinal tract and kidneys can also be involved in HSP. The annual incidence of IgA vasculitis has been reported as ranging from 3 to 26.7/100,000 for children, while the annual incidence for adults is 0.8–1.8/100,000. The cause of HSP is unclear, but genetics and environmental triggers have been investigated. It is more common in the fall and winter in children which suggests an infectious cause; however, no single organism has been isolated. The same seasonal pattern does not hold true for adults. Medications, including vaccinations, have also been suggested as the precipitating cause but have not been substantiated. The risk of renal insufficiency appears to be higher in adults than children (30 % versus 5–15 %). Renal insufficiency is usually more severe in adults, and older adults who present with renal insufficiency and proteinuria >1 g/24 h have a poorer prognosis. Other elements associated with renal disease include fever, recent infection, elevated inflammatory markers, anemia, hematuria, and purpura above the waist. Treatment of HSP is supportive in mild cases. Corticosteroids have been used in varying doses and durations, with and without immunosuppressants. While early intervention has not been studied, given the poorer prognosis in older adults and those with renal disease, it is important to diagnose and initiate treatment for HSP as early as possible. The clinician must maintain a clinical suspicion for HSP in adults that present with any combination of skin rash, renal insufficiency, joint involvement, and abdominal pain or hemorrhage; as it can be an overlooked diagnosis.

HEPARIN AND HYPERKALEMIA—AN UNCOMMON CAUSE OF A COMMON EFFECT

Malini Ganesh; Ankit Mangla; Isaac Paintsil; Fady Iskander. John H Stroger Hospital of Cook County, Chicago, IL. (Tracking ID #2191562)

LEARNING OBJECTIVE #1: Recognize early the side-effect of hyperkalemia with a commonly used drug, heparin

CASE: A 60 year old man with no previous medical history, presented with intermittent fever, productive cough, hemoptysis and 30-pound weight loss for the 3 months prior to admission. Review of systems was negative. Vitals at admission were significant for blood pressure (BP) of 88/63. Systemic examination showed a thin man, breathing comfortably, in no acute distress. Lung exam revealed broncho-vesicular breathing over the left lung field. Labs were obtained which showed hyponatremia to 128 mmol/L which resolved with intravenous hydration, and microcytic anemia with hemoglobin (Hgb) of 9.8. Other labs were unremarkable. A chest X-ray revealed left UL consolidation with multiple cavitary lesions, which was confirmed on subsequent Computed tomography of the chest. The patient was placed on respiratory isolation, and sputum samples sent before initiation of empiric tuberculosis treatment. Sputum smears returned positive for acid-fast bacilli 4+ growth, following which the patient was initiated on anti-tuberculosis therapy. His only other medications during the hospitalization were a single dose of broad spectrum antibiotics in the ER, and subcutaneous heparin for VTE prophylaxis. The patient remained in hospital on anti-tuberculosis therapy (ATT) awaiting setup of directly observed treatment (DOTS). On the third day of hospitalization, routine labs were obtained, which showed a serum potassium of 5.5. Renal function had remained normal on the same panel, and there were no electrocardiographic changes on a subsequently obtained EKG. Potassium remained high on repeat testing the next day, with a value of 5.6. Due to mild hypotension and hyponatremia on admission, 8 AM cortisol was obtained, and ACTH stimulation test done which showed adequate adrenal response. Medications were reviewed, and pneumatic compression device substituted for heparin prophylaxis. The next morning, serum potassium obtained was 4.6. The patient remained stable and was discharged on ATT.

DISCUSSION: In this patient, other causes of hyperkalemia, including renal failure, adrenal insufficiency, medications such as NSAIDs, ACE inhibitors, and volume depletion were ruled out. The hyperkalemia resolved immediately after withdrawal of heparin, with objective evidence of normalization of serum potassium after. Naranjo adverse

reaction probability score was calculated at six, making the possibility of heparin-induced hyperkalemia very likely. First described in the 1960s, the suppression of aldosterone by heparin is a well-documented but lesser known side-effect. It leads to hyperkalemia, and in rare cases hyponatremia and hypotension. This seems a phenomenon exclusive to the zona glomerulosa, sparing the other two cortical axes. Though this effect occurs in normal patients, it appears to be more frequent in patients with pre-existing defects in potassium homeostasis. Predisposed patients with persistent hyperkalemia may even require Fludrocortisone for correction. Frequent monitoring of serum potassium in patients on heparin, and early institution of potassium lowering therapy when needed may reduce life-threatening consequences of hyperkalemia.

HEPATOCELLULAR CARCINOMA PRESENTING AS AN ISOLATED NECK MASS Melinda M. Katz¹; Alice Tang¹; Eleonora Teplinsky²; Barbara Porter¹. ¹New York University School of Medicine, New York, NY; ²NYU Langone Medical Center, New York, NY. (Tracking ID #2192552)

LEARNING OBJECTIVE #1: Recognize a rare and unique presentation of HCC

CASE: A 55-year-old male with a history of hepatitis C virus (HCV), treatment-naïve non-progressive HIV, and chronic osteomyelitis of the left foot presented with 1.5 weeks of isolated neck pain and left arm radiculopathy. He was near completion of his HCV treatment with sofosbuvir, peg-interferon, and ribavirin. His exam revealed decreased strength and sensation in his left upper extremity and tenderness at the posterior base of the neck. Laboratory data was significant for hemoglobin of 10.9 g/dL, erythrocyte sedimentation rate (ESR) of 87 and C-reactive protein (CRP) of 29. Cervical spine angiogram showed a 2.5×3.5 cm destructive lytic mass at the left C7 vertebral body extending into the prevertebral and paraspinal soft tissues, consistent with a metastatic lesion. Computer tomography (CT) scans of the chest, abdomen, and pelvis revealed a 10x17mm lingular nodule and noncirrhotic liver with two ill-defined hepatic lesions (12×11×20 mm and 14×12 mm), which were indeterminate on abdominal magnetic resonance imaging (MRI). Tumor markers, including alpha-fetoprotein (AFP), were all within normal limits. CT-guided biopsy of the C7 mass was performed. Pathology revealed metastatic carcinoma, consistent with hepatocellular origin. There was proliferation of tumor cells with prominent nucleoli and bile pigment in the cytoplasm, morphologically resembling atypical hepatocytes. The tumor cells were positive for Hepar-1 and negative for TTF-1, PSA and PSAP.

DISCUSSION: To our knowledge, this is the first case of hepatocellular carcinoma (HCC) presenting as an isolated cervical mass. Extrahepatic metastases have been described in 14 to 42 % of HCC patients. The lung is the most frequent site involved, followed by lymph nodes, bone, and adrenal glands. However, while extrahepatic metastases are common, they are rare at the time of initial presentation and diagnosis of HCC. In a retrospective study of 4953 patients with HCC, only 0.75 % had bone metastases at diagnosis, with a solitary cervical spine metastasis reported in 2 patients. Further, in a report of 151 patients with primary HCC, the vast majority (93 %) had intrahepatic tumors at the time of diagnosis of extrahepatic metastasis. Of the 28 patients in this study with stage T0-T2 HCC, 96 % had a previously treated intrahepatic malignancy, suggesting that the extrahepatic metastases signified recurrence rather than primary HCC. Although HCC metastases limited to the neck were exceedingly rare, there have been few accounts of skip metastases where the disease bypassed regional lymph nodes. One case reported a 6x6cm periduodenal lymph node determined to be a HCC metastasis without involvement of the hepatoduodenal ligament. Another case reported HCC metastasis to cervical lymph node without regional lymph node involvement. Unlike our patient, these patients each had elevated alpha-fetoprotein levels and fibrotic changes secondary to HCV and notably, our patient did not have a primary lesion. It is unclear whether our patient's HCV infection contributed to this unique presentation of HCC. At the time of presentation, the patient was near completion of his HCV therapy. Treatment of HCV and achievement of sustained virologic response (SVR) is independently associated with a 3.1 times decreased risk of developing hepatocellular carcinoma. However, clearance of hepatitis C does not eliminate the risk of HCC. Patients during and immediately after peginterferon and ribavirin treatment had a 3.4 % rate of HCC. To date, there is no established association between sofosbuvir and increased risk for hepatocellular carcinoma. In conclusion, this patient presented with an isolated cervical metastasis of HCC, which is an extremely rare presentation of this disease. With the rising incidence of HCC, we will likely see more atypical presentations and it is critical for clinicians to consider HCC in patients with a history of HCV, even in the absence of classical symptoms. Ultimately, a better understanding of the pathogenesis of HCV-related HCC is needed to understand the pathogenesis of these unusual presentations and improve outcomes for this patient population.

HERPES ZOSTER IN AN IMMUNE COMPETENT HOST Kent S. Tadokoro; Joanne Bernstein; Soumya Rangarajan; Pinky Jha. Medical college of Wisconsin, Milwaukee, WI. (Tracking ID #2155623)

LEARNING OBJECTIVE #1: To report an unusual case of Varicella Zoster Virus (VZV) infection in an immune competent host

CASE: A 22 year old male presents to urgent care with headache, fever, painful scalp rash, and photophobia. He is given four tablets of ibuprofen and ice packs but does not relieve his symptoms. The patient subsequently presents to a university hospital. Upon presentation, he denies eye pain, change in hearing, taste sensation, weight loss, sick contacts, and new sores on his lips or genitals. Past history is only significant for chicken pox as an infant and mononucleosis in eighth grade. He otherwise does not have any medical problems or prior surgeries. The patient is sexually active with his girlfriend of two years. He works as a teller at a financial institution and attends a university at night. He does not live in the dormitories. Vital signs are within normal limits except for a mild fever of 100.7 ° F. The patient is alert and oriented without changes in mental status. Physical exam is significant for a 1.5 cm by 3 cm left sided postauricular lymph node, as well as a generalized anterior cervical lymphadenopathy. There is a vesicular lesion on his occipital scalp. Nuchal rigidity and decreased active neck flexion due to pain are present. Brudzinski's and Kernig's signs are negative. All other physical exam findings are negative. Lumbar puncture is performed and CSF fluid analysis shows leukocytes of 6 cells/ μ L, 94 % lymphocytes, protein of 50 mg/dL, and normal glucose of 60 mg/dL. PCR analysis of the CSF fluid for HSV-1, HSV-2, and enterovirus is all negative. Blood serology for HIV-1, HIV-2, and infectious mononucleosis is also negative. CT of the head without contrast and chest radiograph is normal. Finally, skin biopsy of the lesion returns positive for VZV. Acyclovir is started for concern of viral meningitis in response to the CSF findings. The patient's headache is treated with hydromorphone, meperidine, ketorolac, and diphenhydramine. Ondansetron and prochlorperazine are given for the nausea. He is admitted to the general medicine service and the infectious disease service is consulted. Their recommendation is to continue IV acyclovir. The pain, nausea, vomiting, photophobia, neck stiffness, and fever all markedly improve on day three and the patient is discharged on IV acyclovir 10 mg/kg q8hr for 14 days. Weekly CBC, CMP, and ESR are checked. At a follow up appointment 3 weeks after discharge, the patient has persistent headaches of lesser severity.

DISCUSSION: Herpes zoster manifesting as acute meningitis in a young, healthy, immune-competent male is extremely rare. It is a reactivation of varicella zoster virus lying dormant in the dorsal root ganglia of sensory neurons after a chicken pox infection. The cell-mediated immune system eradicates the initial viral infection, producing memory cells that prevent re-infection in healthy individuals. Clinically, herpes zoster presents as painful, dermatomal, vesicular papules with a variety of complications. Risk factors for reactivation include advanced age, immune suppressed state, trauma, malignancy, disorders of cell-mediated immunity, and chronic lung or kidney disease. History and laboratory testing for this patient did not show evidence of these risk factors. A possible mechanism of his pathology could be due to his contraction of chicken pox as an infant. Infants have not established a strong cell-mediated immune system; therefore, they do not develop enough memory cells to prevent herpes zoster later in life. Furthermore, meningitis is a rare complication of herpes zoster (0.5 % of cases). Pathogenesis of VZV meningitis is likely due to virus spreading through the choroid plexus by infecting the capillary endothelial cells. In only 10 % of patients, VZV is the causal organism for aseptic meningitis. As opposed to bacterial meningitis, treatment for less severe viral meningitis is usually supportive. This patient was started on empiric acyclovir because of cutaneous clues of herpes zoster; however, standard therapy for VZV meningitis has not been established. In pediatrics, acyclovir is used empirically on a case by case basis depending on severity of disease. Patients who are elderly, immune suppressed, or have received antibiotics prior to hospitalizations should receive empiric antibiotics even if bacteria is negative in the CSF.

HERPES ZOSTER MANIFESTING WITH DYSPHAGIA AND FACIAL DROOP: A UNIQUE PRESENTATION Deepika Sriram¹; Appesh Mohandas³; Sarah Nickoloff^{2, 4}. ¹MCW, Milwaukee, WI; ²Medical College of Wisconsin, Milwaukee, WI; ³Medical College of Wisconsin Affiliated Hospitals, Milwaukee, WI; ⁴Zablocki VA Medical Center, Milwaukee, WI. (Tracking ID #2198669)

LEARNING OBJECTIVE #1: Recognize that dysphagia and facial droop may be associated with herpes zoster.

LEARNING OBJECTIVE #2: Treat Ramsay Hunt syndrome with antiviral therapy and steroids in a timely manner for better prognostic outcome.

CASE: A 67 year old male with a past medical history significant for hypertension, hyperlipidemia, and type 2 diabetes, presented with a bump behind his right ear, swollen and tender ear, and dysphagia. The patient initially noticed dysphagia and pain behind his right ear and subsequently a lesion developed where the pain was located. His primary care provider prescribed clindamycin for presumed skin infection. The pain persisted, and when the lesion developed vesicles, the patient sought further care in the emergency department. He was admitted with a diagnosis of presumed herpes zoster. He was started

on acyclovir, continued his home dose of gabapentin, and was given oxycodone for pain control. Dysphagia persisted, and included both solids and liquids, without odynophagia. He also noticed hoarseness of his voice. The day after admission, he developed right-sided facial droop and lagophthalmos of the right eye. Ophthalmology and otolaryngology were consulted. Otolaryngology visualized his vocal cords and found right cranial nerve VII paralysis, right vocal cord paralysis, and right pharyngeal weakness. Ophthalmology reported exposure keratitis due to lagophthalmos, and hemifacial dyskinesia. MRI brain was unremarkable, and the patient's symptoms were attributed to right cranial nerve VII palsy due to Ramsay Hunt syndrome. He was started on prednisone in addition to the acyclovir. Varicella zoster virus (VZV) IgG and IgM antibodies were positive as were VZV rapid culture and VZV DNA PCR from vesicular fluid. At follow up with his primary care provider a month after discharge, he reported some continued mild tenderness at the site, but his facial droop had improved and dysphagia had nearly completely resolved.

DISCUSSION: Herpes zoster involves the reactivation of the varicella zoster virus and is a very common infection. It may rarely present with multiple cranial neuropathies, with or without skin or ear vesicles, in a syndrome known as Ramsay Hunt. Specifically, the virus reactivates in the geniculate ganglion of the facial nerve with resultant facial palsy, otalgia, and ear vesicles. Per one study, only five percent of patients with herpes zoster develop cranial and peripheral nerve palsies. Recovery rate remains low (26 %), with many patients having long-term deficits, though prognosis is better when treatment is initiated within three days of symptoms. Treatment with steroids and antiviral agents is associated with better prognosis than steroids alone. Clinicians should be aware of the rare and variable presentations of herpes zoster, including dysphagia and facial droop, to ensure timely initiation of appropriate therapy.

HICKAM'S DICTUM OR OCCAM'S RAZOR Jason Dinsmoor; Michael P. Smith. University of Nebraska Medical Center, Omaha, NE. (Tracking ID #2200074)

LEARNING OBJECTIVE #1: Recognize the classic triad of Normal Pressure Hydrocephalus (NPH) and how it affects prognosis and management of NPH

LEARNING OBJECTIVE #2: Recognize geriatric patient's risks for multiple disease processes

CASE: A 79 year-old man presented with encephalopathy after ground level fall. The patient had a history of cognitive decline and multiple falls over the past year. In this particular instance, the patient was found naked on the floor of his skilled nursing facility with no witnesses. He was noted to be incontinent of urine when he was found. His family believed his recent mental decline was due to Alzheimer's disease. The patient's exam was only notable for a minimal exam was 10, a volar dislocation of the fifth distal interphalangeal joint, and a magnetic gate on neurologic testing. He did have a leukocytosis of 34.8 and a urine culture with greater than 100,000 colonies of Escherichia Coli. In addition, imaging of the head with computed tomography showed enlargement of the lateral ventricles including the temporal horns and subsequent MRI confirmed ventriculomegaly consistent with NPH

DISCUSSION: Geriatric patients frequently present to the general Internist with multiple problems. It is up to the Internist to determine which are isolated problems, which problems are interconnected, and which problems are normal parts of aging. Although the patient's recent one year cognitive decline was attributed to Alzheimer's disease and his most recent fall attributed to a complicated urinary tract infection; the patient's triad of cognitive impairment, gait disturbance, and urinary incontinence is classically associated with normal pressure hydrocephalus. A brain magnetic resonance imaging on a patient with normal pressure hydrocephalus demonstrates ventriculomegaly out of proportion to sulcal enlargement without cerebral spinal fluid obstruction. A lumbar puncture can help identify patients likely to respond to shunt placement. In some studies, up to two-thirds of patients can expect some benefit post shunting; however, this improvement will remain for only one half of these patients. With shunting, normal gait is more likely to return than cognitive deficits. In this case, the patient's family was aware his cognition may not return to baseline; however, the family was in favor of shunting the patient. Considering the patient's multiple falls over the prior year, shunting could improve his gait and his quality of life quite significantly. Our patient's case illustrates the importance of recognizing geriatric patients' risks for multiple disease processes by reviewing the classic presentation of NPH. It is important for the general Internist to know this presentation because early recognition and treatment can lead to a significant increase in length and quality of life for the affected patient

HIDING IN PLAIN SIGHT—ACUTE CHOLANGITIS WITHOUT RADIOGRAPHIC FINDINGS Shetal Patel¹; Tyler Stewart¹; Oanh K. Nguyen². ¹UT Southwestern, Dallas, TX; ²UT Southwestern Medical Center, Dallas, TX. (Tracking ID #2197585)

LEARNING OBJECTIVE #1: Diagnose acute cholangitis despite the absence of radiographic findings.

CASE: A 62 year-old man with a history of central diabetes insipidus presented with worsening fever, chills, night sweats and rigors for 6 months associated with a 40-lb weight loss. Rigors had progressed from once a week to daily over the 6 months. Review of systems was otherwise negative for cough, hemoptysis, chest pain, shortness of breath, abdominal pain, nausea, vomiting, constipation, diarrhea, change in urine, rash, swelling, myalgias or arthritis. He attributed his weight loss to a healthy diet over the previous 4 months. Past medical history was notable for malaria and dengue fever acquired in Venezuela in the 1970s and Rocky Mountain spotted fever acquired in New Mexico in 1978 with no residual sequelae. Past surgical history included remote appendectomy, tonsillectomy and right hip replacement. Family history included a maternal aunt and maternal grandmother with rheumatoid arthritis. Social history was notable for occupation as a pilot, though travel history only included a trip to England in the previous year. He had no animal or environmental exposures and no illicit drug use. Vital signs on presentation were: temperature of 38.4 °C, heart rate 90 bpm and blood pressure of 140/60 mmHg. Physical exam demonstrated a well-appearing male in no apparent distress. His lungs were clear, heart was regular without murmurs or rubs. His abdomen was soft, non-tender, non-distended. He had no jaundice, scleral icterus, rashes, joint swelling or lymphadenopathy. Laboratory evaluation revealed a white blood cell count (WBC) of $19.9 \times 10^9/L$, hemoglobin of 15.4 g/dL, aspartate aminotransferase 287 IU/L, alanine aminotransferase 436 IU/L, alkaline phosphatase 390 IU/L, total bilirubin 4.7 mg/dL and direct bilirubin 3.7 mg/dL. Antinuclear antibody was negative. Creatinine kinase and lactate dehydrogenase were within normal limits. Transabdominal ultrasound (TUS) showed mild fatty liver and common bile duct (CBD) at 4 mm with no evidence of cholelithiasis or cholecystitis. On hospital day #1, he developed severe, diffuse abdominal pain. Subsequent computed tomography (CT) of the abdomen and pelvis was unremarkable other than for questionable dense material in the gallbladder, thought to be due to artifact or an adjacent vessel. Repeat labs demonstrated further elevation of WBC to $37.5 \times 10^9/L$ and total bilirubin to 6.2 mg/dL. Urgent endoscopic retrograde cholangiopancreatography (ERCP) was performed, showing an enlarged, bulging ampulla. A complete sphincterotomy revealed abundant purulent material and a 4 mm pigmented bile stone. A diagnosis of acute cholangitis was made. The patient tolerated the procedure without complications, with resolution of all symptoms and leukocytosis over 24 h, and a steady decrease in liver enzyme elevations. He was discharged the following day with a 10-day course of ciprofloxacin and metronidazole with plans for follow up cholecystectomy.

DISCUSSION: Acute cholangitis is a life-threatening medical emergency; untreated, mortality is as high as 90 %. With advances in diagnosis and treatment, including imaging, biliary drainage techniques, antibiotics and intensive care medicine, mortality rates have dropped over the last four decades to less than 11 %. However, mortality for patients with severe cholangitis remains as high as 30 % and may partially reflect those with delay in diagnosis due to atypical presentations. In the above vignette, we describe an atypical presentation of acute cholangitis presenting as prolonged fever of unknown origin without associated abdominal pain. Acute cholangitis classically presents with Charcot's triad (fever, right upper quadrant pain and jaundice) and is supported by laboratory tests (elevated WBC, AST, ALT, alkaline phosphatase, bilirubin) and imaging studies demonstrating CBD stones or biliary duct dilation. Because of easy access and relatively non-invasive nature, TUS and CT are the most commonly used imaging modalities. Both TUS and conventional CT have low sensitivities for detecting CBD stones. TUS has a high sensitivity for detecting biliary duct dilation when present (96 %); however, when CBD stones are small or the obstruction is acute, biliary dilation may not be present, as in our case above. Based on the patient's worsening clinical picture and laboratory tests suggestive of an obstructive pattern, our clinical suspicion for acute cholangitis remained high. Despite his atypical presentation and negative imaging, ERCP was performed. When imaging is inconclusive and clinical suspicion remains high particularly in critically ill patients, ERCP provides timely diagnostic and therapeutic results. In conclusion, internists should be aware of atypical presentations and warned of the limitations of imaging in the diagnosis of acute cholangitis.

HIV/AIDS AND OCCAM'S RAZOR: A HEART-STOPPING REALIZATION

Robert P. McClung¹; Sophia Hussien². ¹Emory University School of Medicine, Atlanta, GA; ²Emory University, Atlanta, GA. (Tracking ID #2200042)

LEARNING OBJECTIVE #1: Recognize the relationship between HIV/AIDS and cardiovascular disease.

LEARNING OBJECTIVE #2: Identify anchoring bias in evaluating patients with complications of HIV/AIDS.

CASE: A 29 year-old African-American female with a history of HIV/AIDS (CD4 count of 12/4 %) off anti-retroviral therapy, diet-controlled type-2 diabetes mellitus, obesity, and

depression was admitted to the hospital with three weeks of pain in her throat, chest, and epigastrium. The pain was rated 8-10/10 in severity and was described as dull and constant. It was not associated with exertion, but worsened with swallowing and was associated with a sensation of food becoming stuck in the throat. She had been evaluated in the emergency department twice in the previous three weeks for these symptoms and treated for GERD and candida esophagitis without relief. Her admission exam revealed normal vital signs, mild oropharyngeal thrush, shoddy cervical lymphadenopathy, and benign cardiac, pulmonary, and abdominal exams. Laboratory testing was notable only for a total white blood cell count of 1800 and hemoglobin of 9.3 mg/dl consistent with her known anemia of chronic disease. She was admitted for esophagogastroduodenoscopy to further assess her continued pain and odynophagia with concern for esophagitis due to candida, HSV or CMV infection. On the third day of admission while awaiting endoscopy, safety labs obtained while on empiric fluconazole revealed an isolated AST elevation (271 U/L, from 12 U/L on admission). Reassessment of the patient demonstrated new sinus tachycardia with a rate of 130 and unchanged chest and epigastric pain. Subsequent testing to identify the source of AST release revealed creatine phosphokinase level of 2581 U/L, troponin-I of 57 ng/ml, and an EKG with anteroapical Q waves and ST elevations in V3 and V4. Emergent echocardiography revealed severe hypokinesis of the anterior wall and apex consistent with a large myocardial infarction. Given her ongoing chest pain, she was taken for emergent cardiac catheterization and underwent thrombectomy and percutaneous coronary intervention for a 100 % occlusion of the proximal left anterior descending artery. Her troponin level peaked at 170 ng/ml and her recovery was marked by residual compromise of left ventricular function with an ejection fraction of 25 %. Of note, subsequent endoscopy also revealed esophageal ulcerations consistent with severe esophagitis.

DISCUSSION: This case highlights two significant diagnostic challenges beyond this patient's notably atypical chest pain presentation. First, it underscores the importance of HIV/AIDS as an independent risk factor for cardiovascular disease (CVD), a risk attributed to numerous factors including increased inflammation, altered coagulation, and endothelial dysfunction observed in chronic HIV infection. Multiple large cohort studies have identified a specific increase in acute myocardial infarction (AMI) in patients with HIV/AIDS regardless of treatment status, even when controlled for traditional CVD risk factors¹⁻³. Furthermore, our patient's race (African-American) and sex (female) indicate additional risk, with one study reporting AMI to be nearly three times more likely in HIV-infected women than in uninfected matched controls². Importantly, elevated risk of AMI in HIV/AIDS also extends to patients under age 30 where the long-term effects of a serious cardiac event may be especially costly. Second, this case demonstrates the peril of anchoring bias in patients with advanced HIV/AIDS. Though this patient's presentation appeared most consistent with gastroesophageal disease, her atypical symptoms, poor response to treatment, and severely immunocompromised state called for a low threshold for re-evaluation and consideration of alternative or additional diagnoses. This HIV-specific caveat to Occam's razor is frequently invoked in considering concomitant opportunistic infections but should extend to key non-communicable conditions with increased prevalence in HIV/AIDS including cardiovascular disease. Attention to this challenge in clinical reasoning may have dramatic implications for the timely recognition of conditions with high morbidity and mortality. 1. Freiberg, MS et al. HIV infection and the risk of acute myocardial infarction. *JAMA Internal Medicine* 2013. 173(8):614-622. 2. Triant, VA et al. Increased acute myocardial infarction rates and cardiovascular risk factors among patients with human immunodeficiency virus disease. *J Clin Endocrinol Metab* July 2007. 92(7):2506-2512. 3. Womack, JA et al. HIV infection and cardiovascular disease in women. *J Am Heart Assoc*. October 16, 2014. 3:e001035.

HOT MESS: DIAGNOSING DENGUE IN A RETURNING TRAVELER

Heidi J. Schmidt. University of California, San Francisco, San Francisco, CA. (Tracking ID #2195044)

LEARNING OBJECTIVE #1: Recognize key features that distinguish Dengue from other febrile illnesses common in travelers returning from tropical areas

LEARNING OBJECTIVE #2: Risk-stratify Dengue patients' need for inpatient admission based on an understanding of Dengue Hemorrhagic Fever and Dengue Shock Syndrome

CASE: A 26-year old female presents to the emergency department 10 days after returning from the Philippines. The patient complains of worsening fever, myalgias, pharyngitis, and headache for three days. While in the ER, she develops new nausea and vomiting accompanied by bloody diarrhea. She did not use any malaria chemoprophylaxis during her travels and recalls many daytime mosquito bites. She drank bottled water and only ate food prepared at her relatives' house; she denies any sexual contact. The patient's past medical history is significant for mild asthma, and her only medication is albuterol. She has no allergies. She does not drink alcohol, smoke, or use recreational drugs. She is in a monogamous relationship with a male partner and tested negative for HIV two years ago. Her family history is non-contributory. Physical exam is notable for

temperature of 39.2°C, pulse of 95, and an abdomen tender to deep palpation only with no organomegaly. She has rubbery mobile cervical lymphadenopathy and a faint morbilliform rash covering her back and chest. Her CBC shows an increased hematocrit, she has a mildly elevated Cr (1.31), and her PT/PTT are within normal levels. The following tests are negative: rapid influenza, HIV antibody, malaria thick and thin smears, heterophile agglutination, E.coli 0157, shiga toxin, and stool O&P. Dengue serologies are sent and IgG is 1.65 (negative <0.90) and IgM is 0.16 (negative <0.90). A diagnosis of Dengue is made, and the patient is admitted because her bloody diarrhea and lab evidence of hemoconcentration are concerning for the development of Dengue Hemorrhagic Fever (DHF). She is managed with conservative treatment including IV hydration, avoidance of NSAIDs, and daily CBC to monitor for signs of DHF.

DISCUSSION: Dengue, an arbovirus with four distinct serotypes, is a common cause of fever in tropical regions. Dengue's incubation period is 4–8 days. Importantly, nighttime mosquito nets are not protective because the Aedes mosquito that transmits Dengue bites during the day [1]. Common symptoms of Dengue are fever, retro-orbital headache, myalgias, arthralgias, and rash [2]. Spontaneous bleeding, including GI bleeding like that experienced by our patient, can also be seen. Diarrhea occurs in almost one third of patients and URI symptoms are common. In resource-poor areas, the tourniquet test can be used to diagnose capillary fragility or thrombocytopenia associated with Dengue [1]. Although serological tests are available, Dengue remains a clinical diagnosis given the poor sensitivity of the antibody tests. For example, IgM positivity can lead to a presumptive diagnosis but is only present in 50 % of patients on day 4 of illness. IgG antibodies are diagnostic only if a convalescent sample is available to compare to titers from the acute illness [3]. For most patients, Dengue is a self-limited and mild febrile illness. However, about 1 % of patients will develop Dengue Hemorrhagic Fever (DHF). DHF is defined by [3]: 1. Plasma leak 2. Thrombocytopenia 3. Fever lasting 2 to 7 days and 4. Hemorrhagic tendency. The most severe form of DHF is Dengue Shock Syndrome (DSS), which is diagnosed when a patient meets all four criteria for DHF plus has evidence of circulatory failure (shock). Fatality rates for DSS are as high as 10 %, but decrease to 1 % with adequate support care [4]. DHF/DSS tends to develop on days 3–7, often as fever subsides; this time is called the critical period. If a Dengue patient is cared for in an ambulatory setting, providers should consider trending CBCs during the critical period to triage the need to manage DHF/DSS by inpatient admission. Providers should also consider inpatient admission if patients meet one of the following criteria [4]: 1. Persistent vomiting 2. Third-spacing or hemoconcentration 3. Spontaneous mucosal bleeding 4. Lethargy or restlessness 5. Liver enlargement. The treatment for Dengue is supportive and includes hydration, avoiding NSAIDs given the propensity for hemorrhage, and monitoring for signs of DHF/DSS as above [1]. REFERENCES: [1] Feder HM and Mansilla-Rivera K "Fever in returning travelers: a case-based approach." *Am Fam Physician* 2013 Oct 15;88(8): 524–30. [2] Kotlyar S and Rice BT "Fever in the Returning Traveler." *Emerg Med Clin N Am* 31 (2013) 927–944. [3] CDC Information for Health Care Providers: Dengue and Dengue Hemorrhagic Fever. (2014). Retrieved from <http://www.cdc.gov/dengue/clinical/Lab/clinical.html>. [4] Showler, Chowdhury, and Bogoch "Fever and rash in a woman returning from the Caribbean." *CMAJ* 2014 May 13; 186(8) E293–4.

HYDRALAZINE INDUCED ANCA VASCULITIS Siddhartha Kattamanchi¹; Pooja Kumar²; Rahul Sehgal¹; Satya Varre¹. ¹Marshfield clinic, Marshfield, WI; ²marshfield clinic-st joshp's hospital, Marshfield, WI. (Tracking ID #2195532)

LEARNING OBJECTIVE #1: Diagnose hydralazine induced vasculitis.

CASE: Sixty-one year old female with past medical history of type 1 Diabetes mellitus, hypertension allergic to multiple antihypertensive medications on hydralazine 50 mg four times daily presented to our hospital with fatigue, fever, pleuritic chest pain and SOB. Going back, her symptoms started about 3 years ago with migratory arthralgia and history of tick bite and were treated as Lyme disease 3 times in 3 years with doxycycline, with improvement on 2 occasions but no improvement on recent episode after 4 month of treatment with doxycycline. She was experiencing migratory joint pains, fatigue, difficulty thinking straight, pleuritic chest pain and progressive SOB and fever ranging between 100 and 103 F. When Evaluated at other hospital, where CXR showed questionable left sided pneumonia and elevated inflammatory markers and negative Lyme serology, was treated with levofloxacin for 20 days without significant improvement in her symptoms. Subsequently developed hemoptysis, CT chest was done that showed picture suspicious for atypical pneumonia and was treated with IV antibiotics for 10 days with no response, therefore patient presented to our facility. Repeat chest CT showed presence of new sub centimeter pulmonary nodules besides ground glass opacities throughout bilateral lung fields and bilateral pleural effusions. Due to extensive nature of the infiltrates vasculitis was also considered in the differential. Work up came back positive for a p-ANCA MPO antibody and a very low titer Pr3 antibody, low positive ANA titer at 1:160 homogenous pattern, positive anti ds DNA antibody, negative c-ANCA antigen and normal complement level, negative rheumatoid factor, high markers of inflammation, ESR between 90 and 100, CRP around 15, normocytic anemia, normal white count and

normal platelet count, normal BNP and CK level. Rheumatology was consulted who did further workup for the autoimmune vasculitis. Anti-histone antibody and lupus anticoagulant was positive. Hydralazine was stopped with initial thought for Hydralazine-induced systemic lupus erythematosus (SLE) in regard to positive anti-histone antibodies. Subsequently Bronchoscopy with Broncho alveolar lavage showed numerous hemosiderin-laden macrophages and total neutrophil count of 567 and negative cultures so a diagnosis of diffuse alveolar hemorrhage due to Hydralazine-induced vasculitis was considered. Patient was started on Prednisone. Her symptoms dramatically improved and were discharged. She continued follow up with rheumatology and repeat CT chest in 2 months showed resolution of ground glass opacities and pleural effusion with improvement in symptoms.

DISCUSSION: Hydralazine was first introduced in 1951 and since then has been mainly used for management of hypertension and heart failure. Hydralazine induced lupus was first described in 1953 and can be found in 5.4 to 10.4 % of hydralazine users. Hydralazine induced vasculitis is a more serious and rare complication. Drug induced lupus presents usually as myalgia, arthralgia, malaise, fever, weight loss. Renal involvement attributable to this condition is rare and when present resembles lupus nephritis with immune complex, immunoglobulin and complement deposits. Hydralazine induced ANCA vasculitis on the other hand usually involves skin and the kidneys. Unlike lupus there is a relative lack of immunoglobulin and complement deposition on histopathology and immunostaining. Pulmonary renal syndrome is the most severe presentation of hydralazine induced vasculitis. There have only been 14 case reports of this condition and only one case of vasculitis with isolated involvement of lungs. Lung involvement presents as pulmonary hemorrhage, which in our patient explains by the hemosiderin laden macrophages on lavage. Most commonly accepted theory for pathogenesis is that, hydralazine accumulates in the neutrophils and binds to myeloperoxidase and induces neutrophil apoptosis. The apoptotic blebs of the neutrophils act as the source of immunogens as evident by the presence of various antibodies which can be seen in hydralazine induced ANCA vasculitis. In hydralazine induced lupus we usually see ANA, Anti histone antibody (AHA), and ANCA (MPO), but anti ds DNA antibodies are usually absent. Whereas in hydralazine induced ANCA vasculitis apart from ANA, AHA, ANCA (MPO) we also see positive anti ds DNA, anti-elastase antibody, low C3 and C4 and occasionally antibodies to proteinase3, anti SSA and anti SSB. Our case is only the second case where patient along with having antibodies to myeloperoxidase has antibodies to proteinase3 (PR3). Anemia is not a feature of drug induced lupus. Management of these cases includes early recognition and discontinuation of the drug. This alone might be enough in mild cases but in cases where discontinuation is delayed or the symptoms are severe, corticosteroids with or without immunosuppressive agents is needed.

HYPEREMESIS GRAVIDARUM FROM SUSPECTED GRAVES' DISEASE

Amaninder Jeet S. Dhaliwal; Garen Derhartunian; Katerina Oikonomou; Rachana Koya; Marina Iskandir; Getaw Hassen. Lutheran Medical Center, Brooklyn, NY. (Tracking ID #2194891)

LEARNING OBJECTIVE #1: Graves' disease is the most common cause of hyperthyroidism in women within reproductive age. Several studies have shown that pregnancy-associated changes in the immune system may influence the onset of Graves' disease or unmask it. We present a case of a 26-year-old female with symptoms of hyperemesis gravidarum likely exacerbated by Graves' disease.

CASE: A 26-year-old female (gravid3, parity2, abortion0) with no significant past medical history presented with a 10 days history of intractable vomiting. The patient stated that for last 10 days she was having more than 12 episodes of non-bilious and non-bloody vomiting on a daily basis. Her symptoms were more frequent and severe in the morning. She reported decreased appetite, heat intolerance, weight loss and palpitations. The rest of her review of systems was unremarkable. At presentation, she was tachycardic with a heart rate of 110 beats per minute and appeared severely dehydrated. She was given intravenous fluids and antiemetics. The rest of her physical examination was normal. A pelvic sonogram confirmed a single intrauterine gestation with estimated gestational age of 10 weeks and 3 days ruling out molar pregnancy. Initial laboratory results were significant for a thyroid stimulating hormone (TSH) level of less than: 0.008mIU/ml, free thyroxine (FT4), 6.10 ng/dl and free triiodothyronine (FT3), 14.1 pg/ml. A working diagnosis of Graves' disease was entertained based on the profound changes of her thyroid function tests. She was started on propylthiouracil (PTU) 100 mg daily and propranolol 10 mg every 8 h with improvement of symptoms. On follow-up the patient's symptoms resolved and her thyroid function tests improved significantly (TSH, 0.008mIU/ml; FT4, 1.81 ng/dl; and FT3, 4.5 pg/ml). TSH receptor antibody titer was normal (0.90 IU/ml) after 6 weeks of treatment.

DISCUSSION: Hyperemesis gravidarum is a common entity among pregnant women. It is usually self-limited and improves during the course of pregnancy. Prolonged hyperemesis may result from a number of conditions such as molar pregnancy, twin gestation and Graves' disease. Graves' disease and human chorionic gonadotrophin

(HCG)-mediated hyperthyroidism are most common causes of hyperthyroidism in pregnancy. HCG-mediated hyperthyroidism is transient and does not require any treatment, as it is self-limiting with fall in HCG levels, typically around 14–18 weeks of gestation. Graves' disease in pregnancy is diagnosed in symptomatic woman with low TSH and FT₃ and FT₄ > 1.5 times the upper limit of non-pregnant normal value and should be treated immediately. In Graves' disease, TSH receptor antibodies (TSHR-AB) are detectable in almost all patients and tend to decline when treated with antithyroid drugs. If TSHR-AB are persistently elevated despite treatment, there is a high probability of recurrence upon discontinuation of antithyroid medications. The drugs of choice for treatment of Graves' disease are PTU, methimazole (MMI) depending upon gestational age, along with beta-blockers. Other therapeutic options are thyroidectomy or plasmapheresis for patients who are intolerant or refractory to thionamides (PTU, MMI). A screening for Graves' disease should be considered in pregnant women with severe and prolonged hyperemesis gravidarum, as this condition requires prompt treatment to prevent maternal and fetal complications.

HYPERMAGNESEMIA CAN STOP THE HEART Chandana Shekar, Sonam Puri. University of Connecticut School of Medicine, Farmington, CT. (Tracking ID #2199441)

LEARNING OBJECTIVE #1: To recognize hypermagnesemia as an important cause of asystolic cardiac arrest.

CASE: A 94 year old female with past medical history of hypertension, congestive heart failure with an ejection fraction of 15 %, chronic kidney disease stage 4, type 2 diabetes mellitus not on insulin, hyperlipidemia, cerebrovascular accident and dementia was brought to the hospital via Emergency Medical Services(EMS) as she was found to be unresponsive by her caregiver. She was in her usual state of health until a few hours before admission, when she started complaining of weakness, dizziness and diaphoresis. She subsequently became unresponsive and EMS was called. She was found to be hypoglycemic with a finger stick glucose reading of 45 mg/dL. Further history was obtained from the caregiver who reported that the patient did not complain of fever, chest pain, difficulty breathing, change in bowel habits, nausea or vomiting. She denied any recent changes in her medications or medication non-compliance. There was no history of use of magnesium containing laxatives or herbal supplements. On her way to the emergency department, she received a 50 mg ampule of dextrose 50 %. On arrival to our hospital, patient was found to be hypothermic with a measured temperature of 83.8 °F and was not able to follow commands. She was noted to be bradycardic with a heart rate of 30 beats per minute and a blood pressure of 115/45 mm Hg. She was maintaining her airway and did not appear to be in respiratory distress. Her bradycardia persisted despite normalization of her blood glucose and core body temperature. She was subsequently started on a dopamine drip. Initial blood work revealed a normal complete blood count and chemistries significant for patient's baseline level of renal dysfunction (blood urea nitrogen 89 mg/dL, creatinine 3.7 mg/dL) with an elevated magnesium level of 4.0 mg/dL. Electrocardiogram showed atrial fibrillation with slow ventricular rhythm, bradycardia in the 50s, no ST or T segment changes, an old right bundle branch block and left ventricular hypertrophy. Cardiac enzymes, prothrombin time, activated partial thromboplastin time and international normalized ratio were within normal limits. Chest X ray showed mild congestive heart failure and vascular congestion. Computed Tomography scan head was negative for any intracranial pathology. Blood cultures drawn in the emergency department did not show any evidence of infection. During her hospital stay, patient remained bradycardic despite being on a dopamine drip. She was subsequently evaluated for pacemaker placement by cardiology. However, on her way to the catheterization lab, she sustained an asystolic cardiac arrest. She was resuscitated as per advanced cardiac life support protocol and spontaneous circulation was restored after 30 min. Pacemaker placement was cancelled and she was admitted to the intensive care unit for monitoring. Nephrology was consulted for persistent hypermagnesemia in the setting of bradycardia. She subsequently underwent hemodialysis for hypermagnesemia. After dialysis, her magnesium levels decreased to 2.1, she was taken off the dopamine drip and her bradycardia resolved.

DISCUSSION: In the hypermagnesemic state, excessive peripheral vasodilation and atrioventricular nodal conduction delays cause hypotension and atrioventricular nodal blocks. Hypermagnesemia is a relatively under recognized but easily treatable cause of bradycardia and cardiac arrest. High index of suspicion is thus required when a patient has elevated magnesium. Treatment of magnesium overload has focused upon hemodialysis, forced diuresis and the use of intravenous calcium salts.

HYPERTENSION: A DELICIOUS DISEASE? Wade Brown. University Of Utah, Salt Lake City, UT. (Tracking ID #2200360)

LEARNING OBJECTIVE #1: Recognize indicators of secondary hypertension.

LEARNING OBJECTIVE #2: Recognize, diagnose, and treat a rare, but notable cause of secondary hypertension

CASE: A 34-year old female was seen for follow up of hypertension. The patient had been diagnosed and started on lisinopril about three weeks prior by an alternate provider. On history, the patient recalled being informed that she had high blood pressure (BP) at about age thirty. She also recounted occasionally being told that she had elevated BPs since that time. The patient reported BPs in the "170 s/100 s" when self-checking at a local pharmacy. She endorsed a reading as high as 201/119 mmHg about 2 months prior. At the time of diagnosis, her BP was 159/104 mmHg via BpTRU®. The patient denied a history of snoring or apnea. She denied use of oral contraceptives, NSAIDs, tobacco, significant alcohol, complimentary medications, or supplements. She denied a family history of early hypertension. The patient denied episodes of chest pain, headaches, palpitations, or diaphoresis. On exam, the patient's BP was 124/88 mmHg with no notable disparity between arms. Pulse was 65 bpm. No Cushingoid features. Cardiac auscultation revealed a regular cardiac rhythm and normal rate. No murmurs or gallops were noted. No renal bruits were appreciated. No edema was present. A basic metabolic panel revealed no abnormalities. A urinalysis showed trace protein, and no blood. A renin to aldosterone ratio was 0.2. An ECG showed no abnormalities. Further discussion revealed that the patient had a history of consuming large quantities of "Australian" black licorice stating, "It's my comfort food." The patient was changed to spirinolactone and strongly encouraged to discontinue consumption of black licorice. The patient's BP improved.

DISCUSSION: Less than 10 % of all hypertensive patients have secondary hypertension (1,2). Indications for screening for secondary hypertension include: age less than 30, hypertension resistant to three medications, severe hypertension, sudden increase in a previously stable BP, or end organ damage (1). This patient's age raised concerns for a secondary cause. In general, a careful history has been shown to reveal a correct diagnosis in about 80 % of medical outpatients (3). In this case, discussion revealed a history of significant chronic ingestion of imported licorice. Hypertension secondary to excessive licorice ingestion is rare, but documented (4, 5). Glycyrrhizic acid (GZA), the molecule responsible for natural licorice flavor, is an extract from the root of the *Glycyrrhiza glabra* shrub (5). A metabolite of GZA inhibits 11-beta hydroxysteroid dehydrogenase, an enzyme that catalyzes the oxidation of cortisol to cortisone. Because cortisol is active at mineralocorticoid receptors, while cortisone is not, accumulation of cortisol results in sodium retention, hypokalemia, alkalosis, and hypertension (5). Because of these, and other known, deleterious effects of GZA, black licorice is generally artificially flavored in North America. However, GZA can be found in imported licorice, soft drinks, teas, and tobacco products (5). Thought the dose-response relationship for GZA has not been fully elucidated, consumption of as little as 50 g of licorice per day has been associated with elevated BP (5). Diagnosis is made by history. Confirmatory findings include hypokalemia, increased urine cortisol, increased cortisol to cortisone metabolite ratio, and low urine aldosterone. In this case, the patient's lab findings were complicated by the recent introduction of lisinopril. The cornerstone of treatment is discontinuation of licorice. Resolution of BP and electrolyte abnormalities can take from 2 to 4 weeks (5). Spirinolactone or triamterene can be used to treat hypertension during that time period. In conclusion, GZA-mediated hypertension is an easily treatable condition diagnosed by knowledge of indicators of secondary hypertension and careful history taking. 1. Rimoldi SF, Scherrer U, Messerli FH. Secondary arterial hypertension: when, who, and how to screen? *Eur Heart J*. 2014;35(19):1245–54. 2. Omura M, Saito J, Yamaguchi K, Kakuta Y, Nishikawa T. Prospective study on the prevalence of secondary hypertension among hypertensive patients visiting a general outpatient clinic in Japan. *Hypertens Res*. 2004;27(3):193–202. 3. Hampton JR, Harrison MJ, Mitchell JR, Prichard JS, Seymour C. Relative contributions of history-taking, physical examination, and laboratory investigation to diagnosis and management of medical outpatients. *Br Med J*. 1975;2(5969):486–9. 4. Farese RV Jr, Biglieri EG, Shackleton CH, Irony I, Gomez-Fontes R. Licorice-induced hypermineralocorticoidism. *N Engl J Med*. Oct 24 1991;325(17):1223–7. 5. Isbrucker RA, Burdock GA. Risk and safety assessment on the consumption of Licorice root (*Glycyrrhiza* sp.), its extract and powder as a food ingredient, with emphasis on the pharmacology and toxicology of glycyrrhizin. *Regul Toxicol Pharmacol*. 2006;46(3):167–92.

HYPERTROPHIC CARDIOMYOPATHY PRESENTING AS POST-PRANDIAL DYSPNEA Alice Tang^{2, 1}, Andrew A. Chang¹. ¹NYU/Gouverneur, New York, NY; ²New York University, New York, NY. (Tracking ID #2191271)

LEARNING OBJECTIVE #1: Recognize post-prandial shortness of breath as a presenting symptom of hypertrophic obstructive cardiomyopathy.

CASE: A 55-year-old Chinese man with a history of untreated hypertension presented with a 10-year history of post-prandial shortness of breath. The patient noted a gradual decline in exercise tolerance from unlimited to 2–3 blocks and a 10-pound weight gain over the preceding year. Three weeks prior to presentation, the patient experienced an

episode of post-prandial dyspnea with palpitations resolving after 15 min of rest. He denied chest pain, dizziness, diaphoresis, nausea, vomiting, wheezing, cough, or anxiety. The patient had a 30 pack-year smoking history. He denied family history of cardiac disease or sudden death. His exam was notable for blood pressure of 149/81, heart rate 90, and a 2/6 holosystolic murmur heard throughout precordium, accentuated by standing and diminished by handgrip. Electrocardiogram revealed left ventricular hypertrophy with repolarization abnormalities. Transthoracic echo showed preserved ejection fraction, severe left ventricular hypertrophy with asymmetric septal hypertrophy, systolic anterior motion of the mitral valve, and severe left ventricular outflow tract gradient of 40 mmHg at rest, consistent with hypertrophic cardiomyopathy. The patient was started on Metoprolol 12.5 mg every 12 h with significant improvement in symptoms.

DISCUSSION: Hypertrophic cardiomyopathy (HCM) is a clinical diagnosis consisting of unexplained left ventricular hypertrophy associated with nondilated ventricular chambers in the absence of another cardiac or systemic disease capable of producing the magnitude of hypertrophy¹. It is a heterogeneous disorder most often caused by an autosomal dominant mutation in genes encoding sarcomere-associated proteins². It manifests with variable clinical severity, from asymptomatic to sudden cardiac death^{2, 3}. Most common symptoms include exertional dyspnea, fatigue, chest discomfort, palpitations, and syncope. However, postprandial dyspnea has been reported in up to one-third of HCM patients in retrospective studies of echo-proven HCM^{4,5}. Post-prandial symptoms are related to splanchnic vasodilation from the food bolus, resulting in preload and afterload reduction and worsened left ventricular outflow obstruction⁶. Post-prandial symptoms confer a 52 % decrease in quality of life and increase in New York Heart Association class III/IV dyspnea and presyncope³. Given these associations, patients complaining of post-prandial dyspnea should undergo complete evaluation for structural heart disease and consideration of HCM. Pharmacologic treatment with beta blockers reduces the incidence of non-sustained ventricular arrhythmias, as well as minimizing outflow obstruction through decreasing heart rate, contractility, and ventricular stiffness⁷.

HYPOMAGNESEMIA MANAGEMENT WITH MULTIPLE MEDICAL CONDITIONS: A DELICATE BALANCE Adrienne N. Poon¹; Jillian S. Catalanotti². ¹George Washington School of Medicine and Health Sciences, Washington, DC; ²The George Washington University, Washington, DC. (Tracking ID #2198932)

LEARNING OBJECTIVE #1: Recognize that etiology of hypomagnesemia may be multifactorial and generate a broad differential

LEARNING OBJECTIVE #2: Describe the physiology and management of renal magnesium wasting

CASE: A 58 year old woman has a history of diabetes mellitus, hyperlipidemia, gastroesophageal reflux disease, chronic leg cramps, chronic diarrhea, depression, and fibromyalgia as well as a prolonged history of hypomagnesemia managed by oral magnesium oxide repletion. After briefly switching magnesium oxide to magnesium chloride (Slow-Mag) due to chronic diarrhea, the patient's Mg acutely dropped to 1.1 mg/dL with worsening of bilateral leg cramps. She was sent to the ED for repletion with IV magnesium sulfate. Two weeks later, she reported cramping in all extremities with spasms and twitching affecting her quality of life by night-time awakenings despite good hydration. The patient's medications included magnesium oxide, metformin, esomeprazole, insulin glargine, liraglutide, furosemide verapamil, and levothyroxine. Vital signs were unremarkable. Physical exam revealed bilateral calf tenderness, no edema, good distal pulses, and pain with motion of the left lower extremity at hip and knee. Repeat magnesium was 1.2 mg/dL. Other labs included: K 4.7 mmol/L, CO2 19, Creatinine 0.81 mg/dL, Glucose 197 mg/dL, PTH 16 pg/ml, Calcium 9.2 mg/dL, Phosphorus 3.9 mg/dL, and Hgb A1C 7.5 %. A 24-h urinary magnesium revealed daily excretion of 62.1 mg and fractional excretion of magnesium of 4 %, suggesting renal loss as a major contribution to her hypomagnesemia. She visited the ED on multiple occasions for IV magnesium repletion given the severity of cramps. On one occasion she was discharged after repletion to 2.0 mg/dL but was found to have Mg of 1.3 mg/dL several days later. The patient was treated with rifaximin for possible small intestinal bacterial overgrowth (SIBO), and afterwards noted significant improvement in diarrhea. Her proton pump inhibitor was switched to an H2 blocker, amiloride started, and furosemide discontinued. Oral magnesium was stopped in favor of repletion through diet, and she received calcium carbonate to alkalinize serum. Magnesium improved significantly and stabilized at ~1.6 mg/dL with significant improvement in cramps and resolution of diarrhea and calf tenderness on exam.

DISCUSSION: Hypomagnesemia in the setting of multiple chronic medical conditions must be managed carefully. Steady improvement addressing the root causes in an outpatient setting is preferred rather than using rapid parenteral repletion unless hypomagnesemia is severe. This patient's hypomagnesemia was most likely multifactorial in nature; thus it is important to develop a broad differential diagnosis. Renal wasting was the primary cause, with significant improvement upon starting amiloride, stopping furosemide, and inducing metabolic alkalosis. The majority of magnesium is reabsorbed through

the cortical thick ascending limb (~72 %) through a paracellular pathway driven by a voltage gradient. Reabsorption also occurs through the distal convoluted tubule (DCT) (~10 %) both passively through a transmembrane voltage gradient and then actively against electrochemical gradients. Amiloride blocks DCT sodium channels to hyperpolarize cells and induce passive Mg reabsorption through a voltage gradient. Although the patient rarely took furosemide, it was important to discontinue because its NA-K-2Cl cotransporter inhibition reduces the voltage gradient driving paracellular reabsorption. Inducing metabolic alkalosis through administration of calcium carbonate also increases paracellular Mg reabsorption through a more favorable gradient as well as through the DCT, possibly by reducing protonation of the Mg pathway. PPIs may inhibit GI absorption of magnesium. In this patient, it was important to monitor calcium levels since she was taking a higher dose of calcium carbonate than advised due to persistent heartburn after switching from a PPI to H2 blocker. Hypercalcemia inhibits magnesium reabsorption in the cortical thick ascending limb through a calcium/magnesium-channel sensor that inhibits paracellular reabsorption. This patient likely also had GI losses through diarrhea associated with SIBO that was worsened with oral magnesium supplementation. This was evidenced by the patient's improvement in magnesium as well as resolution of diarrhea after receiving rifaximin and discontinuing oral magnesium supplements. The patient was ultimately able to maintain magnesium levels through diet and avoid oral supplements. One key element of this patient's course was repeated ED visits for IV repletion with magnesium. Unfortunately, high serum magnesium levels stimulate the calcium/magnesium-sensing receptor and likely reduce paracellular absorption of magnesium, worsening renal loss. A delicate balance was needed to replete by IV only if severely low and symptomatic, while otherwise addressing the root multifactorial causes of hypomagnesemia.

I BRUISE EASILY Meredith M. Barr; Benjamin Bailey. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198570)

LEARNING OBJECTIVE #1: Review the work-up of isolated prolonged PTT

LEARNING OBJECTIVE #2: Discuss the causes of acquired factor VIII deficiency

CASE: A 55-year-old African American woman presented with complaints of 4 days of oral swelling and difficulty swallowing with associated dyspnea. Her past medical history only included chronic obstructive pulmonary disease. She reported a 1-month history of spontaneous bruising of the extremities and vaginal spotting. Review of systems was also positive for 1 month of subjective fever, and morning stiffness, bilateral knee and wrist pain. She had no previous history of clotting disorder or family history of clotting disorders. On triage in the emergency room, she was found to have scattered oral ecchymosis. Given her dysphagia, a laryngoscopy was performed showing laryngeal bruising. Laboratory abnormalities showed an isolated PTT prolongation of 46.6 s. Mixing study showed failure of PTT to correct. Subsequent evaluation of Factor VIII was ordered showing a low level of 1.03 (normal 50–150) testing suggestive of acquired factor VIII inhibitor (Factor VIII inhibitor elevated). An underlying reason for acquired factor VIII inhibitor was considered including concern for rheumatologic condition or malignancy given risk factors and review of systems suggestive of arthralgias. Rheumatologic history was not consistent with any clear disease process; antinuclear antibody and rheumatoid factor negative. Further malignancy screening was negative for both signs of hematologic and solid tumor malignancy. She was subsequently placed on high dose prednisone and cyclophosphamide in order to suppress factor VIII inhibitor. She was placed on recombinant factor VIIa twice daily with close inpatient monitoring of symptoms and factor VIII levels as an inpatient. At the time of discharge she had increased factor VIII level to 3.04 % (off recombinant factor) and was discharged with hematology follow up on continued prednisone, cyclophosphamide, and tranexamic acid.

DISCUSSION: Isolated prolonged PTT has a narrow differential of diseases affecting the intrinsic pathway of the clotting cascade. Often PTT is prolonged by iatrogenic causes including low molecular weight heparin or heparin use. Outside of medication causes patients presenting with prolonged PTT fall in two major groups: factor deficiency (primarily factor VIII) or lupus anticoagulant, which is more likely to cause hypercoagulable state. When factor deficiency is considered, a mixing study must be obtained to distinguish factor deficiency from the existence of factor inhibitors. A mixing study that does not correct to normal is suggestive of a factor inhibitor or acquired hemophilia A. Acquired hemophilia A is a rare bleeding disorder caused by autoantibodies directed against clotting factor VIII. As opposed to a factor deficiency, it is more likely to occur in adults and often presents with hemorrhages in the soft tissues. Acquired hemophilia A has an association with multiple disease processes including rheumatologic disease, solid tumor malignancy, chronic pulmonary disease, pregnancy, diabetes and hepatitis. In spite of these associations, the etiology of the disease remains idiopathic in greater than 50 % of cases. Treatment of acquired hemophilia A concentrates on controlling acute bleeding and suppressing the autoantibody. Treatment of bleeding is achieved with replacement of the lost factor, factor VIII concentrates in low titer inhibitors, or factor VIII bypassing agents such as recombinant factor VII in patients with high inhibitor titers. Long-term

suppression of the factor VIII antibody is achieved with cyclophosphamide and high dose steroids.

IDIOPATHIC NON-UREMIC CALCIPHYLAXIS: A CASE STUDY Shakil Shaikh; Kah Poh Loh; Behdad Besharatan. Baystate Medical Center/Tufts University, Springfield, MA. (Tracking ID #2199344)

LEARNING OBJECTIVE #1: Recognize and diagnose calciphylaxis in a non-uremic patient.

LEARNING OBJECTIVE #2: Identify causes of non-uremic calciphylaxis, and possible treatment modalities.

CASE: A 77-year old female with a history of vascular insufficiency, atrial fibrillation on warfarin (started a year prior to current admission), and hypertension, presented to our facility on multiple occasions for worsening lower extremity necrotic ulcers of unknown etiology, refractory to previous treatment modalities. She presented to us on current admission for intractable pain secondary to the ulcers, and was further admitted for pain management, along with further work-up regarding etiology of ulcers. No associated systemic symptoms were noted and she denied any weight loss. She did not drink, smoke or use recreational drugs. Her ulcers began approximately 3 years prior, and started on her left lower extremity that gradually progressed to the right lower extremity. Biopsies showed epidermal ulceration with underlying inflammation and fibrosis, along with calcification of the vasculature. She was initially managed conservatively with topical treatment, followed by prednisone, to which there was no significant improvement of the ulceration. Given no definite diagnosis and her increasing narcotic requirement, a repeat biopsy was performed during hospitalization, which showed progressive intravascular calcifications in smaller blood vessels; large caliber vessels were identified without calcium deposition, highly suggestive of calciphylaxis. Of note, her renal function was normal throughout. Concerning for non-uremic calciphylaxis, work-up for secondary causes were sought but were essentially unremarkable, including normal metabolic, autoimmune, infectious, vasculitic and hormonal (TSH, PTH, vitamin D) panel, as well as protein C and S. She was up-to-date with age appropriate cancer screening, with negative CT chest, abdomen and pelvis. She was eventually diagnosed with idiopathic non-uremic calciphylaxis, started on 20 mg IV infusion of sodium thiosulfate (STS), three times a week, for a 3-week duration with plans to taper off prednisone and warfarin. While on STS, her primary care physician is actively following up with her for resolution of ulcers.

DISCUSSION: Calciphylaxis is a progressive syndrome of small vessel arteriolar calcification, resulting in ischemia and necrosis, commonly seen in patients with end stage renal disease (ESRD) secondary to abnormalities in the calcium-phosphate axis. It has been reported as low as 4 % in patients undergoing hemodialysis. Although bone and mineral metabolism, hyperparathyroidism, and vitamin D therapy have all thought to contribute to uremic calciphylaxis, the exact cause of the disease process remains unknown. Calciphylaxis in non-uremic patients is furthermore a rarity, as research has only been able to cite less than 100 cases since 1990, most commonly seen in Caucasian females. Diagnosis of calciphylaxis is based on clinical, biochemical, histopathological and radiological findings. In our patient of non-uremic calciphylaxis, the diagnosis was deduced clinically from her necrotic ulcers confirmed by calcium deposition by histopathology and normal laboratory and radiological work-up. Causes of non-uremic calciphylaxis are hypothesized to include malignancies, parathyroid hormone effects on RANK ligand expression, or secondary to warfarin use, which can inhibit vitamin K-dependent carboxylation of matrix-Gla protein, decreasing the activity of the aforementioned protein to inhibit calcification deposition. Other causes, as seen in a systematic review of cases reported before 2007, also include diabetes, alcoholic liver disease, weight loss, CKD (not ESRD), Crohns disease, vitamin D deficiency and protein C/S deficiency. Warfarin and prednisone were identified as possible triggers although in our patient, her ulcers preceded the initiation of both medications by at least 1.5 years. Treatment for calciphylaxis secondary to ESRD involves intravenous STS; due to limited cases of non-uremic calciphylaxis, treatment is often empiric. The reported duration of IV STS treatment ranges from 3 to 12 weeks. As per previous cases, treatment for non-uremic calciphylaxis involved treatment with IV STS 25 mg every morning, with improvement noted in 2 months, and complete resolution in 6 months. Other cases discussed IV STS 20 mg infusions three times weekly with resolution in 3 weeks. In our patient, we initiated IV STS 20 mg infusions three times per week, and she was closely followed up for adverse side effects and resolution of ulcerative lesions. It has been seen that IV STS can be effective in refractory calciphylaxis in non-uremic patients. Larger studies, however, are needed to determine the exact mechanism of IV STS in non-uremic calciphylaxis patients.

IDIOPATHIC OCCIPITAL NEURALGIA A RARE CAUSE OF DEBILITATING HEADACHE Larry J. McMann; Tiba Alwardi; Vesna Tegeltija; Salwan Al-Mutar; Reem Al-Mahdawi; Hussam Sabbagh; Sarwan Kumar; Khalid Zakaria; Zain Kulairi; Alex Adams. Wayne State University, Rochester, MI. (Tracking ID #2182557)

LEARNING OBJECTIVE #1: Identify the presentation of occipital neuralgia

LEARNING OBJECTIVE #2: Judicious use of diagnostic tools and treatment

CASE: A 27-year-old female presented to the ER with episodes of severe intermittent headache over the past 3 weeks. Prior to her presentation at admission she reported 2 episodes of intermittent pain on the right occipital region. She promptly followed with her primary care physician who prescribed her oral steroids. The 2 weeks following the initial episodes were symptom free. On the day of admission she was watching television when she experienced a recurrence of the 10/10 right sided occipital headache with radiation over her vertex. Initial vital signs were unremarkable, however, physical exam was significant for tenderness over the right occipital region of the scalp. Labs were within normal limits. MRI did not reveal any abnormality. A consultation to neurology was obtained and the patient was started on carbamazepine, gabapentin and narcotics, which provided little relief. The patient's distribution of pain in the greater occipital area in addition to ruling out secondary causes of headache made ON the likely diagnosis. Pain management was consulted and greater occipital nerve block was performed which provided complete resolution of her symptoms. She was discharged home with carbamazepine the following morning and continued to be symptom free at follow up.

DISCUSSION: Occipital neuralgia is usually defined as paroxysmal stabbing pain in the greater or lesser occipital nerve distribution. Although there is no published data to suggest the incidence of occipital neuralgia (ON), it is generally considered a very rare cause of headache. ON is a rare cause of headache that has no published data on incidence. Since this is a rare disorder there is limited evidence in the literature to support the full understanding of its physiology and treatment. Currently, the diagnosis is made by history, characteristics described in the International Headache Society, exclusion of referred pain by CT/MRI and anesthetic block of the occipital nerve. Patients with severe symptoms can continue to have a debilitating headache despite conservative management. The best treatment in the acute setting is the same intervention for diagnosis, which is an occipital nerve block. Patients with recurrent ON symptoms despite steroid injections benefit from botulinum injections and pulsed radiofrequency. This case illustrates the detailed diagnostic evaluation and the need for high suspicion by the primary physicians to consider ON. It is often challenging to diagnose, yet it is critical to do so as early diagnosis and treatment can maximize recovery.

IDIOPATHIC PANCREATITIS: AN UNCOMMON INITIAL PRESENTATION OF ULCERATIVE COLITIS Ana I. Velazquez; Naoka Murakami; Priyanka Mittar. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2198057)

LEARNING OBJECTIVE #1: Recognize extraintestinal manifestations of Ulcerative Colitis (UC) and their presentation as early disease manifestation.

CASE: A previously healthy 26 year old Caucasian (Ashkenazi Jew) male presented with 7 days of crampy left upper quadrant abdominal pain radiating to his back and blood-tinged diarrhea (5–10 episodes/day). Patient had visited his primary care provider and had been prescribed amoxicillin for “community-acquired diarrhea” without improvement. Denies sick contacts, unintentional weight loss, and personal or family history of gastrointestinal disease. Physical exam was significant for abdominal tenderness to palpation over left upper quadrant without rebound and guarding. Labs were significant for elevated lipase 1380 U/L (normal 23–300), C-reactive protein (CRP) 3.1 mg/dL (normal <1.0), and CBC, serum albumin, bilirubins and Alkphos were within normal range. These results support acute inflammatory process including acute pancreatitis and/or colitis, but inconsistent with chronic long-standing inflammation. Given clinical picture of pancreatitis on presentation, CT abdomen pelvis was ordered, which revealed mild peripancreatic stranding and thickening of the entire colon and rectum consistent with acute pancreatitis and diffuse colitis. Complete investigation aiming to discover a possible cause for the acute pancreatitis such as biochemical disturbances, including calcium, autoimmune causes, including ANA and IgG4, tryglycerides, cholelithiasis, and drug or alcohol consumption was negative. Given patient's age, ethnicity, elevated inflammatory markers and presenting symptoms, inflammatory bowel disease (IBD) was suspected; infectious causes were ruled out with negative stool cultures, ova and parasite as well as C. difficile toxin. Colonoscopy showed inflammatory changes in a continuous and circumferential pattern from the anus to the cecum suggestive of ulcerative colitis (UC). Pathology showed chronic colitis without granulomas or dysplasia, consistent with UC. A diagnosis of idiopathic acute pancreatitis in the setting of newly diagnosed IBD was made. Our patient was discharged on mesalamine with resolution of diarrhea and improvement in left abdominal cramping on 2-week post discharge follow up.

DISCUSSION: UC and Crohn Disease are associated with a number of extraintestinal chronic inflammatory diseases that can present following a diagnosis of IBD or as initial presentation. These diseases include primary sclerosing cholangitis, PBC, ankylosing spondylitis, iritis/uveitis, pyoderma gangrenosum, and erythema nodosum. Our case described a case of acute idiopathic pancreatitis as an initial manifestation of UC. Patients with IBD have a 1.5- to 2.1-fold increased incidence of both acute and chronic

pancreatitis, however, clinical symptoms of IBD-associated acute pancreatitis are found only in approximately 1.4–2.7 % of patients. The most frequent causes of acute pancreatitis in UC are cholelithiasis, drug-induced (mainly by mesalazine, immunosuppressors, glucocorticoids and metronidazole), duct obstruction, autoimmune, and alcohol induced; in our case, common causes of acute pancreatitis were ruled out. Idiopathic pancreatitis has been described as an extraintestinal manifestation of UC that rarely can present as an initial manifestation of newly diagnosed UC. It's important to recognize the association of acute pancreatitis and IBD, given that the predominant findings may be caused by acute pancreatitis rather than colitis, delaying the time of diagnosis. Clinicians should pay extra attention to obtaining a detailed history and thorough physical exam in order to recognize the multiple extraintestinal manifestations of UC that may present prior to gastrointestinal symptoms.

ILIACUS MUSCLE ABSCESS COMPLICATING CROHN'S DISEASE IN PREGNANCY Lara Dakhoui; Charles Berkelhammer. UIC/Advocate Christ Medical Center, Oak Lawn, IL. (Tracking ID #2202900)

LEARNING OBJECTIVE #1: Recognize the complications of Crohn's disease (CD) in pregnancy.

LEARNING OBJECTIVE #2: Diagnose pyogenic skeletal iliacus muscle complicating Crohn's disease in pregnancy without the use of ionizing radiation. Manage skeletal muscle abscesses in pregnancy without the use of ionizing radiation.

CASE: A 24 year old female presented during her pregnancy, at 31 weeks gestation, with a complaint of right flank pain of 3 weeks duration. The pain radiates to her right groin and thigh, and is exacerbated by minor movements of her right lower extremity (RLE). It progressed till she found ambulation difficult. She was diagnosed with CD at age 18 and has been on remission with azathioprine, but the patient elected to discontinue azathioprine when she found out she is pregnant. Her pregnancy was uneventful until 31 weeks gestation when she complained of right groin and thigh pain. She denied fever and chills. On physical exam, there was a significant tenderness with any movement of the RLE, pain on raising the right leg off the bed with a positive psoas sign. Magnetic resonance imaging (MRI) revealed an abscess in the right iliacus muscle with thickening of the adjacent ileum. Ultrasound (US) guided drainage of the abscess was performed with 90 ml of purulent fluid retrieved. The fluid cultured multiple enteric organisms. She received 4 weeks of intravenous cefepime. A repeat MRI confirmed the resolution of the abscess. She had uneventful induced delivery at 37 weeks with a healthy infant. Post partum, the patient underwent elective ileocecal resection.

DISCUSSION: Purulent musculoskeletal complications can occur as a result of abscessing/fistulizing CD.¹ These complications can also occur during pregnancy as well. Our patient chose to stop her Azathioprine during pregnancy which may have increased her likelihood of a flare-up of CD and subsequent complications. An iliacus muscle abscess was able to be diagnosed by MRI without gadolinium, and the abscess was treated by US guided drainage without the use of ionizing radiation. MRI and US guided drainage are the preferred methods for the diagnosis and management during pregnancy. Purulent musculoskeletal complications of CD have been described in 4 % of patients.¹ MRI has been utilized to diagnose muscle abscesses in CD, 2 which is the optimal imaging technique during pregnancy. Abscesses that had been described include gluteal muscle abscesses, iliopsoas muscle abscesses, rectus muscle abscesses and sacral osteomyelitis. In conclusion, physicians should be aware of pyogenic complications of CD including during pregnancy. MRI is a useful imaging modality to diagnose a muscle abscess in pregnant women. US guided drainage of these abscesses is helpful in avoiding ionizing radiation in this setting. Management of patients with Crohn's related abscesses in pregnancy requires the expertise of multiple specialties. **References:** 1- Berkelhammer C, Debre M, Gutti P. Piriformis muscle abscess complicating Crohn's ileitis. *Inflamm Bowel Dis*. 2005 Nov;11(11):1028–9. 2-Tonolini M, Ravelli A, Campari A, Bianco R. Comprehensive MRI diagnosis of sacral osteomyelitis and multiple muscle abscesses as a rare complication of fistulizing Crohn's disease. *J Crohns Colitis*. 2011 Oct;5(5):473–6.

IMMUNE THROMBOCYTOPENIC PURPURA IN A PATIENT WITH SARCOIDOSIS: CASE REPORT AND REVIEW OF THE LITERATURE. Mohammed A. Bahaa Aldeen¹; Nibras Talibmamy²; Omar Nadjem¹; Essam Nakhla¹; Abdel Rahman A. Omer¹; Steven Urban¹. ¹Texas Tech Univ Health Sciences Center, Amarillo, TX; ²Kufa, Alnajaf, Iraq. (Tracking ID #2195203)

LEARNING OBJECTIVE #1: Investigate the association between sarcoidosis and immune thrombocytopenic purpura.

LEARNING OBJECTIVE #2: The prognosis of ITP in patients with sarcoidosis has become more favorable in response to modern therapies. The cause for the association of these two diseases remains unknown.

CASE: A 42 year old man presents with 1 day history of spontaneous bleeding from gums and oral cavity as well as generalized purpura. The patient has noted black stools for several days. He denies recent fever or infectious symptoms. Past medical history is remarkable for pulmonary sarcoidosis confirmed by excisional biopsy of a periportal lymph node 3 years before admission. The patient also has moderate intellectual impairment. The patient does not use ethanol, tobacco, or any non-prescribed drugs. P/E BP 130/70, HR 120 and regular, RR 20, temperature 99.1, oxygen saturation 95 % on room air. Diffuse petechiae on the face, neck, chest, and legs were noted (see images). There was stable clot in the gum area and two 1 cm diameter hemorrhagic bullae on the oral mucosa. No lymphadenopathy was detected. Lungs: clear to auscultation bilaterally, without rales or wheezing. Normal cardiac exam. Abdominal exam: normal bowel sounds, but splenomegaly was present. Lab: WBC 4.7, Hb 12.5 gm/dL, Hct 39 %, MCV 75 fl, platelets 5000 mm³, neutrophil 73 % and lymphocytes 14.8 %. PT 12.8 s with INR 1.08. BUN 16 mg/dL, creatinine 0.6 mg/dL. Serology negative for Hepatitis/HIV/H Pylori. Peripheral blood smear showed no schistocytes or abnormal platelets. **Hospital Course:** The patient was resuscitated with IV fluids and started on prednisone 60 mg orally daily as well as proton pump inhibitor. After three days of prednisone therapy, there was no improvement in platelet count or clinical status. The patient's hemoglobin declined, requiring the administration of 2 units of packed rbc's, and melena continued. At this point, intravenous immunoglobulin (IVIG) was instituted, again with no effect on platelet number. On day 8, the patient developed headache and confusion as well as limited alveolar hemorrhage. He was moved to MICU, where a head CT showed intracranial hemorrhage without midline shift. Rituximab and five units of platelets were given, still without improvement in the platelet count. The patient and his guardian refused the option of splenectomy, and the patient was discharged to a hospice facility. Upon return to the clinic (24 days after institution of steroids, 18 days after the third and last dose of rituximab), however, his platelets had risen from 9000 to 206,000, and the petechiae and mucosal bleeding had resolved.

DISCUSSION: In 1938, Jersild et al. were first to report the occurrence of thrombocytopenia in sarcoidosis (9). Since then, only 65 cases have been reported (1,6,7,8). In their 2011 review of the topic (1), Mahevas et al. indicate that thrombocytopenia in sarcoidosis can stem from three main mechanisms: hypersplenism, bone marrow infiltration, and immune thrombocytopenia (ITP), with this last mechanism accounting for 80 % (16 of 20) of cases. Unlike thrombocytopenia in lupus erythematosus or other autoimmune diseases, sarcoidosis-associated ITP has been reported as particularly severe at presentation and outcome, with a trend to unresponsiveness to available treatments and to death (5). In a review by Dickerman et al. in 1972, 5 deaths related to bleeding were reported among 33 patients (15 % mortality rate) (11). After the development of immunoglobulin therapy, less death were reported among ITP patients. Most reported observations, however, have involved single cases or small series, leading to possible biases by selecting the most severe patients, as well as patients treated before the era of modern management of ITP. Mahevas et al. (1), in their retrospective study of 20 cases of ITP and sarcoidosis, came to these conclusions: 1) ITP at presentation was usually severe, but response to treatment was favorable in almost all cases, with no deaths and no severe bleeding, in contrast with older reports. 2) the sarcoidosis in cases with ITP was often characterized by acute onset, chronic course, and the need for prolonged prednisone therapy, and 3) the onset and evolution of sarcoidosis and ITP were not always synchronous. Our patient presented with severe, symptomatic thrombocytopenia and was initially refractory to steroids and IVIG. In this regard, he was similar to cases reported by Dickerman, emphasizing severity of the disease process at presentation. Like the patients reported by Mahevas after the development of more advanced therapy for ITP, however, our patient eventually responded favorably to rituximab-based treatment. Despite his high risk of surgical mortality, our patient was considered for splenectomy, but he and his decision-makers refused consent. In retrospect, it might be advisable to manage patients with high surgical risk conservatively to give a chance for platelets to recover with medical intervention.

IN SEARCH OF A CULPRIT: A CASE OF MASSIVE HEMOLYSIS FROM A COMMONLY USED DRUG Jane M. Zhu; Timothy Schmidt; Marcia Glass. University of California, San Francisco, San Francisco, CA. (Tracking ID #2195025)

LEARNING OBJECTIVE #1: Recognize a rarely reported and catastrophic adverse reaction of piperacillin, a frequently used antibiotic

LEARNING OBJECTIVE #2: Review the management of drug-mediated hemolysis.

CASE: A 47-year-old paraplegic man presented with severe pain from his sacral decubitus ulcers. On exam, he was tachycardic, diaphoretic, and had multiple foul-smelling, full thickness ulcers. He had no allergies and took no medications. Labs were notable for a white blood count of 22,000/mm³, hemoglobin of 8.5 g/dL, and creatinine of 4.2 mg/dL. He was empirically started on vancomycin and piperacillin-tazobactam for sepsis. Within 24 h of admission, a nurse performing routine vital signs found the patient unresponsive and without a pulse. A code blue was activated. Pericardial, the patient's hematocrit was 4.4 %, with hemoglobin "unmeasurable due to interfering substances." Platelets were

196,000/mm³, down from 317,000/mm³ at admission. Stat CT imaging of the chest, abdomen, and pelvis did not demonstrate a source of bleeding. His bedside nurse denied any melena or hematochezia during the day. A number of hemolysis labs were sent and were notable for lactate dehydrogenase 2411 u/L, haptoglobin 25 mg/dL, reticulocyte percentage 2.62 %, and total bilirubin 2.4 mg/dL. A peripheral smear revealed severe anemia, red cell agglutination, microspherocytes, and hemophagocytosis by neutrophils. The team initiated massive transfusion protocols and attempted to locate more complete records from outside hospitals. Records from one area hospital revealed that the patient had been transfused for a 6-point hemoglobin drop after receiving piperacillin-tazobactam during a hospitalization only three weeks earlier. There, he had received empiric steroids in the ICU before leaving against medical advice. Against this information, piperacillin-tazobactam was discontinued immediately. Further work-up at our hospital revealed that the patient had a strongly positive direct antiglobulin test as well as a positive indirect antiglobulin test. An antibody screen later returned positive piperacillin antibodies in both the serum and eluate. Because he developed worsening renal insufficiency from sepsis and hemoglobinuria, the patient was started on plasmapheresis in an attempt to remove the antibodies mediating this reaction and to decrease the level of piperacillin in the blood more quickly. His blood counts eventually stabilized with supportive care, but he was found to have evidence of severe anoxic brain injury.

DISCUSSION: This patient had massive piperacillin-induced hemolysis and subsequent pulseless arrest. Historically, methyldopa and high-dose penicillin have been responsible for the majority of drug-induced hemolysis cases. Complex penicillins, including piperacillin, and second- and third-generation cephalosporins, such as cefotetan and ceftriaxone, are increasingly associated with this adverse reaction, which involves the development of an antibody to a drug, a red blood cell (RBC), or a combination of the two. Drug-induced processes therefore can be serologically indistinguishable from primary autoimmune or warm hemolytic anemia, and a presumptive diagnosis can be made only if the patient responds to withdrawal of the drug. This patient's strongly positive direct antiglobulin test was consistent with an immune-mediated mechanism, and was verified to be due to piperacillin antibodies against RBCs in subsequent testing. Piperacillin-induced hemolytic anemia has been reported to have a 6 % fatality rate in one case series, although these numbers are as high as 50–100 % in pediatric and cystic fibrosis patients and are likely underreported. Hemolysis usually resolves within several days of discontinuing the medication but occasionally requires months to fully resolve. In cases of severe hemolysis, and when drug-dependent antibodies are involved, limited data suggest that corticosteroids may aid in recovery. RBC transfusions also can be given, but the transfused cells may hemolyze at a similar rate as the endogenous RBCs if drug and antibody are still present. Because significant concentrations of residual drug or drug-antibody complexes may be present in the patient's serum, drug-dependent antibodies will react frequently against non-drug-treated RBCs. This finding is highly contingent on plasma drug concentration, and more commonly described with anti-cefotetan, anti-ceftriaxone, and anti-piperacillin antibodies. The role of plasmapheresis in such cases is not yet established but can theoretically facilitate removal of the offending agents. Piperacillin-tazobactam is a first-line broad spectrum antibiotic with millions of doses administered annually. Although it is a reported cause of drug-mediated hemolysis, many clinicians are not aware of its potentially catastrophic adverse effects.

INFLUENZA VACCINE TRIGGERING THROMBOTIC THROMBOCYTOPENIC PURPURA (TTP) Neil Gupta^{1, 2}; Yihan Yang¹. ¹Yale, New Haven, CT; ²Yale University, New Haven, CT. (Tracking ID #2199392)

LEARNING OBJECTIVE #1: Know the mysterious signs and symptoms associated with TTP

LEARNING OBJECTIVE #2: Recognize the rare risks of vaccines, including TTP

CASE: A 40-year-old African-American female with hypertension, hyperlipidemia, and type 2 diabetes was initially admitted to an outside facility with diarrhea and severe lightheadedness. Two weeks prior to presentation, she received the influenza vaccine at a local pharmacy and immediately developed cough and flu-like symptoms for one week. During the second week, she began experiencing fatigue, headaches, dizziness, abdominal pain, confusion, and dark urine, rendering her unable to complete her tasks at work. Review of systems was also notable for shortness of breath and increased bruising. Home medications included Zocor, Metformin, Lisinopril/HCTZ, Prevacid, and Toprol XL. Her vitals on admission were within normal limits with an unremarkable physical exam. Her labs were significant for platelet count 10,000, LDH 800, fibrinogen 419, and schistocytes on peripheral smear. ADAMTS13 level was <3 %. Other work-up, including direct Coombs test, HIV, and hepatitis panel, was negative. Her presentation was felt to be consistent with TTP, though she had normal creatinine. She underwent four rounds of plasmapheresis but continued to have recurrent thrombocytopenia. During her fourth treatment, she had an anaphylactic reaction. She was started on high dose prednisone

and was able to tolerate two additional rounds of plasmapheresis with good response. At the time of discharge, her platelet count was above 200, and her symptoms had resolved.

DISCUSSION: Our patient was diagnosed with acute TTP caused by autoantibody-mediated ADAMTS-13 deficiency. TTP is typically diagnosed based on a pentad, including microangiopathic hemolytic anemia with schistocytes on smear, fever, renal dysfunction, neurological signs, and thrombocytopenia. TTP can be familial or can occur due to various secondary causes, including viral or bacterial infection, pregnancy, autoimmune disease, organ transplant, cancer, or immunosuppression. The acquired deficiency of von Willebrand factor (vWF) cleaving protease, ADAMTS-13, has been associated with the diagnosis of TTP. Acquired TTP can occur due to inhibitory antibodies against the vWF cleaving protease. Our patient's clinical signs and symptoms as well as laboratory data all supported the diagnosis of TTP. After an extensive work-up, the development of our patient's TTP was attributed to the influenza vaccine. While vaccination is an important part of preventive medicine, vaccines have been associated with autoimmune events in rare instances. In our particular patient, we believe that our patient acquired TTP since the vaccine produced anti-ADAMTS IgG inhibitor. There are minimal case reports in the literature of TTP following administration of the flu vaccine, and this is known as a rare side effect. However, our patient responded to plasmapheresis and corticosteroids, the known treatments for acquired TTP, and her platelet count recovered. In conclusion, we present a patient with TTP following the flu vaccine. The patient initially presented with various mysterious symptoms after the flu vaccine and was ultimately found to have TTP. Signs and symptoms of TTP can be varied and subtle, but it is important to remain alert to them. The association with the influenza vaccine is seen in few case reports in literature but demonstrates the rare side effects of vaccines.

INTEGRATIVE MEDICINE THERAPIES FOR CHRONIC HEADACHE: A CASE REPORT Justin G. Laube^{1, 2}; Lawrence Taw^{1, 2}. ¹UCLA, Los Angeles, CA; ²David Geffen School of Medicine, Los Angeles, CA. (Tracking ID #2194040)

LEARNING OBJECTIVE #1: Recognize the potential role of integrative medicine therapies in the management of chronic headaches.

LEARNING OBJECTIVE #2: Recognize the overlapping features of chronic migraine and chronic tension-type headache.

CASE: A 59 year old male attorney with a past medical history of anxiety, sleep apnea and migraines was seen at a university-based integrative medicine clinic with a complaint of daily headaches. His headache was described as a "tension" that radiated from the occiput to his orbits, moderate severity, bilateral and was worse in the afternoon and upon awakening. His headaches improved with massage of the neck, and avoidance of work-related stress. He recalls having headaches since childhood and both his mother and sister have chronic migraines. Three times per week his headache worsens and is accompanied by unilateral blurring of vision, nausea, vomiting, and photophobia. This worsening can be precipitated by alcohol and weather changes. To manage both types of headaches he regularly uses sumatriptan, aspirin and hydrocodone, prescribed by his PCP. He had previously seen a neurologist and was prescribed amitriptyline and propranolol for prophylaxis which were ineffective despite 6 month trials. He denied any persistent visual changes, hearing loss, numbness or weakness. His sleep was poor and he sparingly uses his CPAP because of mask fitting issues. He reports eating large amounts of red meat with limited fruit and vegetables. On exam, he is overweight. His neck was supple with a full range of motion. Palpation of his upper trapezius muscles and base of occiput reproduced the radiating pain to his orbits. Neurologic exam was normal. No prior imaging of his head or spine was reported, and recent blood tests were within normal limits. Treatment focused on his chronic daily headaches for which he was seen every 2 weeks for a total of 5 visits. Each visit included acupuncture for 15 min and trigger point injections with 1 % lidocaine to the trapezius and splenius capitis musculature. A self-care plan incorporating self-massage and stretching of the neck/shoulder region was implemented. Stress management included walking and meditation. He was advised to reduce alcohol use and increase his intake of vegetables. After the first treatment he reported no migraine symptomatology and had reduced his PRN pain medication use to only ½ tablet of hydrocodone per week. He reported ongoing reduction of headache frequency and severity at each visit. By his last visit, the frequency had fallen to twice per week, severity was rated as mild, had not required any PRN pain medications, and his overall quality of life had greatly improved. During his treatment, he was adherent to the dietary recommendations, self-massage plan, and relaxation techniques.

DISCUSSION: Chronic daily headache (CDH) is characterized by having symptoms > 15 days/month for 3 months or 180 days/year. Prevalence is estimated to be 4 % of the adult population¹. CDH encompasses multiple different headache diagnoses, most commonly chronic migraine (CM) and tension type headache (TTH). There is significant overlap between migraine and TTH, with one study finding 58 % of migraine patients reporting tension-type symptoms and 68 % of TTH reporting migraine-type symptoms². This patient case exhibits features of both chronic TTH and CM complicated by medication overuse, undertreated sleep apnea, and unmanaged stress. Many patients with chronic

headache are dissatisfied with a purely pharmacotherapy-based approach because of side effects and refractory symptoms. Rates of complementary and alternative medicine (CAM) use by headache sufferers is reported as high as 50 %³. A Cochrane review in 2009 investigating the use of acupuncture for migraine prophylaxis concluded acupuncture is at least as effective as, or possibly more effective, than prophylactic drug treatment, and has fewer adverse effects⁴. Similarly, in the same Cochrane release, it was concluded acupuncture could be a valuable option to treat frequent episodic or chronic TTH⁵. A meta-analysis in 2007 strongly supported the use of other CAM interventions including mind-body therapies in the management of recurrent migraine and TTH⁶. This case exhibits the potential of utilizing an evidence-based, integrative medicine approach that incorporates conventional and CAM therapies while encouraging patient participation in the treatment of chronic headache conditions. 1-Garza I, Schwedt T. Diagnosis and management of CDH. *Semin Neurol* 2010;30(2):154–66. 2-Turkdogan D, Cagirci S, et al. Characteristics and overlapping features of migraine and TTH. *Headache* 2006;46:461–68. 3-Adams J, Barbary G. CAM use for headache and migraine. *Headache* 2013;53(3):459–73. 4-Linde K, Allais G, et al. Acupuncture for migraine prophylaxis. *Cochrane Database Syst Rev* 2009;1. 5-Linde K, Allais G, et al. Acupuncture for TTH. *Cochrane Database Syst Rev* 2009;1. 6-Sierpina V, Astin J, Giordano J. Mind-body therapies for headache. *AAFP* 2007;76:1518–24.

IS HIV ALWAYS ON OUR RADAR? Kristen Hysell; Onyema Ogbuagu; Lydia A. Barakat. Yale New Haven Hospital, New Haven, CT. (Tracking ID #2194841)

LEARNING OBJECTIVE #1: Recognize specific clinical signs and symptoms of chronic HIV infection.

LEARNING OBJECTIVE #2: Review current guidelines for universal HIV screening.

CASE: Patient #1 is a 60 year old Caucasian male with a history of coronary artery disease with ischemic cardiomyopathy, chronic obstructive pulmonary disease, and lupus in remission, who had been evaluated over a two year period for pancytopenia and fatigue, during which time he was also noted to have recurrent esophageal candidiasis. In the most recent 8 months he had a 40 lb weight loss and complained of worsening, disabling fatigue. He denied any history of risky sexual contact or illicit drug use. Patient #2 is a 55 year-old African American male with a 4 year history of severe psoriasis, 2 year history of pancytopenia, recurrent oral candidiasis, and recurrent herpes zoster who presented with 25 lb weight loss over a four month period, fatigue, and non-productive cough of one month duration. Both patients had been followed closely by multiple subspecialists for several years and had undergone, extensive work-ups targeting their individual problems. However, human immunodeficiency virus (HIV) testing was not offered until their disease was advanced. Abnormal CD4 counts in bone marrow examination of the first case and flow cytometry testing in the second case finally prompted HIV testing. Unfortunately, both patients tested positive and were found to have very low CD4 counts of 18 and 1 cell(s)/microliter, respectively, indicating advanced acquired immunodeficiency syndrome (AIDS). Upon more extensive history-taking, it was discovered that the first patient had received a blood transfusion in the pre-HIV screening era and the second patient had a remote history of risky sexual behavior. Both individuals were ruled out for active opportunistic infection (OI) and subsequently started on antiretroviral therapy and appropriate OI prophylaxis.

DISCUSSION: These two cases highlight the need for providers to be properly trained on the signs and symptoms suggestive of chronic HIV infection, including unexplained weight loss, diffuse lymphadenopathy, recurrent oral or esophageal candidiasis, herpes zoster, severe dermatological conditions including psoriasis, or unexplained anemia, leukopenia, or thrombocytopenia. Furthermore, health care providers need to be aware of and consistently practice the current guidelines for routine HIV screening. Currently, in the United States it is estimated that more than 1.2 million people are living with HIV/AIDS and approximately 20 % are undiagnosed. The most recent CDC guidelines advise universal opt-out HIV screening for all adolescents and adults (ages 13–64) at least once and more frequently in the setting of certain risk factors. However, as illustrated in the described cases, some patients, particularly those over the age of 50 and without obvious high risk behaviors, may fail to be tested. It is crucial that residents in training and internists are appropriately trained in caring for the HIV population with emphasis on early diagnosis and linkage to care in order to prevent adverse outcomes related to AIDS and the risk of HIV transmission to others.

ISCHEMIC STROKE WITH HEMORRHAGIC CONVERSION: AN UNCOMMON COMPLICATION OF HYPEROSMOLAR HYPERGLYCEMIC STATE
Andrew Kelly; Vinay Rao. University of Connecticut, Hartford, CT. (Tracking ID #2199117)

LEARNING OBJECTIVE #1: Recognize the utility of serial neurologic examinations in patients with hyperosmolar hyperglycemic state to investigate for alternative etiologies of persistent unresponsiveness

CASE: A 50-year-old female with a past medical history of type 2 diabetes mellitus was found unresponsive naked on the floor of her house by her significant other. When paramedics arrived, she was responsive only to painful stimuli. She was transported to the emergency department with stable vital signs but she was intubated for airway protection. Initial laboratory evaluation revealed serum glucose 2205 mg/dL, Na⁺ 124 mmol/L, K⁺ 3.1 mmol/L, Cl⁻ 86 mmol/L, bicarbonate 15 mmol/L, BUN 17 mg/dL, creatinine 2.5 mg/dL, lactic acid 8.1 mmol/L, and trace serum ketones. Urinalysis was positive for glucose (>1000 mg/dL), but negative for ketones. Measured serum osmolality was 397. HbA1c was 13.2 %. Amylase 506 U/L (range 29–103) and lipase was 1299 U/L (range 11–82). Of note, 2 years previously, the patient presented with the same sequelae of uncontrolled diabetes mellitus, altered mental status, hyperosmolar hyperglycemic state with a serum glucose >2000 mg/dL as well as pancreatitis with lipase >1200 U/L. On this admission, original head CT to evaluate for additional causes of altered mental status did not reveal any acute intracranial process. Serial neurologic exams were performed. With the administration insulin and aggressive fluid resuscitation, the patient's serum glucose levels and serum osmolality improved. However, there was minimal improvement in her mental status, prompting persistent, thorough neurologic examinations. On day 2, focal neurologic deficits were found. A repeat head CT demonstrated a 3.5×1.8 cm left cerebellar hemorrhagic infarct. Neurology was consulted. They suggested possible ischemic component on original imaging, now with hemorrhagic conversion. Serial neurologic examinations continued and revealed gradual deterioration to decerebrate posturing. A third head CT at this time was read as stable hemorrhagic infarct. Miraculously, over the next few days, the patient's neurologic status improved. She became increasingly responsive and was successfully extubated. Her recovery was remarkable with slight left-sided weakness (4/5 muscle strength in upper and lower extremities). The patient progressed to ambulating with a rolling walker. She was discharged to a skilled nursing facility for further rehabilitation.

DISCUSSION: This case reinforces the importance of clinical bedside evaluations. Despite the patient's improvement in serum glucose levels and serum osmolality, her mental status did not correspondingly improve. Only through persistent serial neurologic examinations, the new diagnosis of hemorrhagic infarct was established. Had her sustained altered mental status solely been attributed to the original diagnosis of hyperosmolar hyperglycemic state, the opportunity to diagnose this uncommon and serious complication would have been missed. Extensive review of the literature corroborates the rarity of intracranial hemorrhagic infarction as a complication of hyperosmolar hyperglycemic state. Most literature describes hyperglycemia as a consequence of strokes rather than their potential precipitant. The causal relationship between these two disease states deserves further consideration.

IT IS NOT A MIGRAINE Arthur O. Omondi. Montefiore Medical Center, Bronx, NY. (Tracking ID #2197161)

LEARNING OBJECTIVE #1: Understand the pathophysiology of polyarteritis nodosa

LEARNING OBJECTIVE #2: Establishing the diagnosis of PAN

CASE: Twenty-nine year- old man with Ulcerative Colitis on mesalamine presented with fever and occipital headache of 2 days duration. He also noted myalgias and photophobia. He had no recent travel or sick contacts. He had a history of treated hepatitis b infection. On physical exam his neck was noted to have full range of motion with subjective stiffness. He was febrile and hypertensive. Lab work revealed leukocytosis, elevated creatinine above his baseline, low hemoglobin and hematocrit. Cerebrospinal fluid from spinal tap revealed lymphocytic pleocytosis. Reactive markers; Erythrocyte Sedimentation Rate and C reactive protein were elevated. Urinalysis revealed proteinuria, hematuria but no red blood cell casts. A few days after presentation he developed scrotal pain and bilateral conjunctival injection. Fundoscopic exam revealed retinal Roth spots and micro-vascular infarcts. Computed tomography angiography done to evaluate for pulmonary embolism had incidental finding of coronary arteriomegaly. Repeat Computed Tomography of thorax, abdomen and pelvis showed arterial ectasia, beading and multiple aneurysms involving multiple arteries. A diagnosis of polyarteritis nodosa was made based on these findings. He was started on high dose methylprednisone and cyclophosphamide. Patient was discharged after a prolonged hospitalization with outpatient follow up with rheumatology with daily prednisone 20 mg and monthly cyclophosphamide infusions. His initial presenting symptoms had resolved.

DISCUSSION: Fever and headaches are commonly encountered by internists. A good history and physical and a methodical approach is essential in determining the less common causes of this presentation. Vasculitis is generally considered within the broader category of immune-complex diseases. Pathogenic mechanisms of vasculitis involves immune-complex formation and deposition, antineutrophil cytoplasmic antibodies(ANCA) or pathogenic T—lymphocyte responses and granuloma formation. Polyarteritis nodosa (PAN) is an ANCA- negative multisystem, necrotizing vasculitis of small and medium- sized muscular arteries in which involvement of renal and visceral arteries is characteristic. PAN may be idiopathic or triggered by specific agents. The most

typical is hepatitis B virus (HBV). The reduction in the incidence of PAN may be related to the decrease in HBV infection achieved by widespread vaccination. Moreover, other systemic necrotizing vasculitides (i.e. ANCA associated vasculitis, cryoglobulinemic vasculitis) are recognized as distinct entities due to increased awareness and improved diagnostic techniques. Non specific signs and symptoms are the hallmark of PAN. Fever, weight loss and malaise are present in over one-half of cases. The non specific presentations sometime lead to CT imaging with incidental discovery of arterial aneurysms that are characteristic of PAN. Histopathologically, in the acute stages, polymorphonuclear leukocytes infiltrate all layers of the vessel wall and perivascular areas. Mononuclear cell infiltration follows as the lesions become subacute and chronic. Intimal proliferation, vessel wall degeneration with fibrinoid necrosis, thrombosis, ischemia, and infarction are seen in varying degrees. Aneurysmal dilations up to 1 cm in size along the involved arteries are characteristic of PAN. Multiple organ systems are involved and the clinicopathologic findings reflect the degree and location of vessel involvement and the resulting ischemic changes. The pathology in the kidney is that of arteritis without glomerulonephritis. There are no diagnostic serologic tests for PAN. The diagnosis of PAN is based on the demonstration of characteristic findings of vasculitis on biopsy material of involved organs. In the absence of easily accessible tissue for biopsy, the arteriographic demonstration of involved vessels, particularly in the form of aneurysms of small and medium-sized arteries in the renal, hepatic, and visceral vasculature, is sufficient to make the diagnosis. Treatment of PAN is determined by the extent of disease. Mild forms of PAN are treated with steroids only. In life threatening or rapidly advancing PAN, methylprednisone pulses and immunosuppressants like cyclophosphamide are used. Although the incidence of vasculitis is low, physicians should have it in their differential in patients presenting with meningitis like symptoms.

IT'S ALL IN THE CRESCENTS- RAPIDLY PROGRESSIVE GLOMERULONEPHRITIS Manisha Bhide, University of Colorado Denver, Aurora, CO. (Tracking ID #2200841)

LEARNING OBJECTIVE #1: Recognize the urgent workup necessary for new onset hypertension, lower extremity edema, microscopic hematuria, and elevated creatinine.

LEARNING OBJECTIVE #2: Understand the differential diagnosis and appropriate studies when rapidly progressive glomerulonephritis is suspected

CASE: R. is a healthy 60 year-old woman with no significant past medical history who presented after incidental discovery of abnormal labs during a local health fair. The patient also had concern for new onset hypertension- although her home systolic blood pressures (BP) have historically been 120–130 s, the patient's BP at the health fair was 161/90; subsequent home BP checks were also as high as 160 s/90s. The patient also noticed new onset lower extremity edema in the 2–3 weeks leading to the clinic visit. Her past medical history is remarkable for borderline hyperlipidemia, which she manages with exercise and dietary modification. Patient's family history is pertinent for a brother with hypertension and no history of other renal disease. The patient takes supplemental vitamins only- no prescription medications. Physical exam at the clinic visit was remarkable for blood pressure of 145/86, 2+ bilateral lower extremity edema extending to mid-shin with 1+ edema up to the knees; she had no periorbital edema. The patient's health fair labs from the preceding month were remarkable for a creatinine of 1.68, with CBC and electrolyte panel within normal limits. Previous labwork 6 months previously were all within normal limits; creatinine was 0.95. Clinic visit labs are remarkable for a creatinine of 1.9 with positive ANA titer (1:320), C3 & C4 within normal limits, negative HIV/Hepatitis serologies, negative SPEP/UPEP, and negative ANCA testing. She had a Hemoglobin A1c at 6.0 % 6 months prior to this presentation, but had improved to 5.6 % with lifestyle modification at the time of the abnormal creatinine. Point-of-care Urinalysis was remarkable for 4+ protein, large blood, negative leukocyte esterase and nitrite. Twenty-four hours urine studies were remarkable for 2.6 g of protein. The patient was started on 20 mg PO furosemide with some improvement in lower extremity edema. Repeat BMP 1 week later was remarkable for creatinine of 2.25 with intermittent worsening of lower extremity edema. The patient was admitted for further evaluation- renal ultrasound with Doppler study was remarkable for mildly elevated resistive index of the right kidney but otherwise negative for evidence of obstruction, stenosis, or abnormal kidney size. The patient underwent renal biopsy of the left kidney. Pathology revealed focal segmental necrotizing and crescentic glomerulonephritis with 15 % fibrocellular crescents, pauci-immune, without significant nephrosclerosis or basement membrane disease. The patient was started on 60 mg prednisone; ultimately Ms. R. will be treated with cyclophosphamide therapy for pauciimmune focal segmental crescentic glomerulonephritis.

DISCUSSION: Rapidly progressive glomerulonephritis (RPGN) is a condition that can be insidious in onset. It can present with symptoms of macroscopic hematuria, decreased urine output, and edema over days-weeks-months. If left untreated, this condition can lead to end-stage renal disease in weeks to months; it is crucial for internists to act quickly and arrange urgent nephrology evaluation if RPGN is suspected. The differential for this patient prior to biopsy included ANCA associated vasculitis, lupus nephritis, anti-

Glomerular basement membrane (GBM) antibody disease, and IgA nephropathy. There are multiple subsets of RPGN, including Anti-GBM antibody disease, immune complex, pauci-immune, and idiopathic RPGN. It is important to obtain any history of concurrent upper respiratory symptoms (hemoptysis, etc.), which may suggest ANCA mediated autoimmune disease. The pathognomonic finding for inflammatory glomerulonephritis consists of multilayered accumulations of proliferating cells in Bowman's capsule (crescents). The severity of the renal disease is dependent on the extent of circumferential crescents present on renal biopsy. Patients with crescentic involvement of less than 50 % of glomeruli have less severe disease, which may lead to remission with appropriate treatment. Urgent workup entails complete metabolic panel, CBC, 24-h urine protein/creatinine, urine protein electrophoresis studies, and autoimmune studies including ANCA serologies, ANA, Anti GBM antibodies, and complement levels. Renal biopsy is crucial for characterization of the RPGN. The internist should closely monitor blood pressures; adequate blood pressure control is necessary prior to renal biopsy. Further treatment is dependent on the type of glomerulonephritis- it often entails immunosuppression in the form of high-dose steroids, cyclophosphamide or rituximab, and even plasmapheresis in severe cases. The role of the internist in quickly recognizing this condition and arranging appropriate workup and diagnosis impacts the overall prognosis in each patient with RPGN.

IT'S NOT A TUMOR: A CASE OF NONMALIGNANT BRAIN AND LUNG MASSES Annelys Roque³, Ryan Nall², Umna Ashfaq¹, Yaseen Perbtani¹, Margaret C. Lo³. ¹University of Florida, Gainesville, FL; ²University of Florida, Gainesville, FL; ³University of Florida College of Medicine, Gainesville, FL. (Tracking ID #2128899)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of Nocardia infection

LEARNING OBJECTIVE #2: Diagnose disseminated Nocardiosis in an immunocompetent individual and recognize common diagnostic pitfalls.

CASE: A 56-year-old male presented from an outside hospital with 1 week history of fever, chills, headaches, blurry vision, and fatigue. Outside head CT revealed a right 1.2 cm parietal mass; chest x-ray showed a left lower lobe (LLL) density with small pleural effusion, suspicious for a lung mass. He was referred for neurosurgical intervention of his presumed brain metastases from a primary lung malignancy. Upon transfer, the patient had no focal weakness, confusion, cough, hemoptysis, dyspnea, or rash. His medical history was significant for Type 2 diabetes (A1c 10.2 %), active smokeless tobacco use, and extensive traveling as a cattle buyer across the Southern U.S. Lab values were notable for elevated ESR 44 mm/h and glucose 261 mg/dL with normal CRP, CMP, CBC, HIV, blood, fungal, and AFB cultures. Full-body CT showed 4 cm×2.2 cm LLL lung mass and mediastinal lymphadenopathies. Brain MRI exhibited two ring-enhancing right parietal lesions. The patient underwent a CT-guided biopsy of the LLL lung mass. Meanwhile, Neurosurgery continued to counsel the patient on his grave prognosis and prepped him for palliative resection of the brain metastases. However, lung cytology revealed active and chronic non-caseating granulomas; tissue histopathology ultimately grew *Nocardia beijingensis*. The patient was started on a 6-week course of IV Amikacin, Bactrim, and Meropenem, later to be transitioned to oral Bactrim for 12 months. His course was complicated by cerebral edema requiring right craniotomy. Intraoperative drainage of the parietal mass exhibited abscesses. The patient was eventually stabilized and discharged to a rehabilitation facility.

DISCUSSION: This case illustrates the susceptibility of clinicians to label a diagnosis as malignancy based on others' preset diagnosis and on pattern recognition of lung masses. Literature have cited cases of Nocardiosis mistaken for malignancy given its nonspecific presentation. Diagnosing Nocardia is further problematic due to limited case reports in the U.S. and its isolation difficulties in microbiology cultures.¹ Nocardia species are ubiquitous actinomycetes found primarily in soil. Most recent geographical prevalence has cited the Southern U.S. region due to its hot, dry climate.¹ Nocardia is known to infect certain animals i.e. cats, dogs, cattle.² As an opportunistic pathogen, Nocardia targets patients with impaired immunity i.e. malignancy, HIV, transplant recipients. Clinically, nocardiosis manifests in 3 patterns—pulmonary, cutaneous, and disseminated. As the most common, pulmonary nocardiosis follows inhalation of aerosolized bacteria and presents as bronchopneumonia. Hematogenous dissemination from the lung spreads most often to the brain. Alcoholism and immunocompromised states are predisposing factors to brain dissemination. With its vague symptoms, clinical risk factors and detailed social history remain important diagnostic clues for disseminated nocardiosis. Our patient's profession as a cattle buyer, repeated exposure to soil, and extensive travels in the Southern U.S. were key social risk factors. His immunocompetent state should not mislead clinicians. Both pulmonary and systemic nocardiosis have been reported in relatively immunocompetent patients with COPD or diabetes,^{1,3} as true in our case. Poor prognostic indicators include older age, concurrent pulmonary aspergillosis, and trimethoprim-sulfamethoxazole resistance³—which our patient had none. *Nocardia*

asteroides is the most frequent nocardiosis in the U.S.⁴ The isolation of *Nocardia beijingensis* in our patient with only diabetes makes this case exceedingly rare. Most cases are reported in Asia and Europe. There has only been one other case report of *Nocardia beijingensis* infection in the U.S., specifically a pulmonary case at Mayo Clinic in Jacksonville, Florida.⁵ Given the dangerous nature of *Nocardia* and the prolonged treatment course required for eradication, prompt recognition of *Nocardia* is needed for optimal patient outcome. The diagnosis of *Nocardia* infection requires its identification from tissue specimens. Acid-fast and gram stains are insufficient. Species identification is important to determine antibiotic resistance profiles of the different *Nocardia* species.⁵ Lastly, this case teaches clinicians the need to recognize and confront three common diagnostic errors, specifically anchoring, premature closure, and pattern recognition. Such faulty cognitive approaches can have negative downstream effects, including patient anxiety, treatment delays, and unnecessary tests. Given its similar clinical presentation to malignancy, recognizing the pathogenesis of disseminated Nocardiosis, reassessing our patient's risk factors, and obtaining tissue histopathology were crucial in the proper diagnosis of his lung and brain masses.

IT'S NOT YOUR TYPICAL COUGH. PULMONARY KAPOSI SARCOMA IN A NON-HIV PATIENT Arber Kodra; Maciej Walczyszyn; Bushra Mina. Lenox Hill Hospital, New York, NY. (Tracking ID #2198471)

LEARNING OBJECTIVE #1: Kaposi Sarcoma (KS) is an angioproliferative tumor associated with human herpes virus 8 (HHV-8). Often known as one of the AIDS defining skin diseases, pulmonary involvement in KS has only been discussed in a handful of case reports, rarely in a non-HIV patient. The infrequency with which it is encountered makes Pulmonary KS a formidable diagnostic challenge. The purpose of this vignette is to provide an example of the clinical and radiographic findings seen in this disease.

CASE: Seventy-seven year-old male, presented with a 6-week history of progressive dyspnea on exertion accompanied by cough productive of yellow sputum and intermittent hemoptysis. On admission, the patient denied fever, chest pain, recent travel, or sick contacts. Past medical history was significant for Non-Hodgkin Follicular B-Cell Lymphoma treated with three rounds of R-CHOP chemotherapy for recurrent disease. Patient also had biopsy-confirmed cutaneous KS status post treatment with Doxorubicin. His vital signs on admission were temperature 99.8 °F, blood pressure 94/60 mmHg, heart rate 110 beats/min, respiratory rate 16 breaths/min, and oxygen saturation 92 % on room air. Physical exam was notable for a 2 cm firm, non-tender, mobile right submandibular lymph node. Lungs were clear to auscultation. Multiple violet non-tender skin lesions were localized to edematous lower extremities. The patient's labs were grossly unremarkable. No leukocytosis was noted. An outpatient CT scan of the chest had shown bilateral hilar lymphadenopathy, numerous peribronchovascular nodular opacities, and small pleural effusions. Chest X-ray on admission showed a worsening right basilar opacity. Subsequently, a bronchoscopy revealed diffusely hyperemic, swollen mucosa of the lower airways with mucopurulent secretions. Treatment was started for suspected pneumonia. Due to clinical deterioration, a repeat CT scan of the chest was performed, demonstrating increased bilateral pleural effusions. A thoracentesis showed sero-sanguineous exudative effusions. Histopathology failed to demonstrate malignant cells or lymphoma. Stains and cultures of urine, blood, BAL, and pleural fluid were negative. Pneumocystis jiroveci PCR and fluid cytology were also negative. The PCR for HHV-8 showed 5800 DNA copies/mL. The final impression was that his pulmonary symptoms were likely due to KS. Upon addressing goals for care, the patient decided not to undertake any further treatment. He was discharged home.

DISCUSSION: This case illustrates the potential for lung injury from KS. Distinctive manifestations that separate KS from other pathologic processes in the lungs have not been identified. However, recognition of this syndrome is critical to the institution of appropriate therapy. This case is unique in that the patient did not match the typical KS subgroup. Moreover, in non-HIV patients, it clinically resembles classic KS but occurs at a younger age, is limited to the skin, and has a good prognosis. However, our elderly patient demonstrated both dermatologic and pulmonary manifestation suggesting a disseminated and aggressive form of the disease.

ITCHING THE WAY TO A CURE FOR CHRONIC ABDOMINAL PAIN Carolyn Koulouris; Rachel Stark. Cambridge Health Alliance, Somerville, MA. (Tracking ID #2198659)

LEARNING OBJECTIVE #1: To identify the signs and symptoms of chronic infection with *Schistosomiasis mansoni* in an immigrant from an endemic country

LEARNING OBJECTIVE #2: To appreciate that pruritic dermatitis can be a manifestation of chronic infection with schistosomiasis, though more commonly presents with abdominal pain or symptoms of portal hypertension

CASE: A 49-year old woman with a history of hypothyroidism, seronegative arthritis, depression, fibromyalgia, and chronic abdominal pain presented to a Boston area community based primary care clinic in the summer of 2014 with a complaint of 8 months of unremitting pruritus and dermatitis. The patient had been evaluated for the same complaint at three previous appointments, and was treated on separate occasions with topical steroids for presumed contact dermatitis, avoidance of sun exposure for possible photosensitivity, and discontinuation of all medications for presumptive drug reaction. The patient's past medical history is significant for more than 10 years of left upper quadrant abdominal pain, depression, and chronic joint pain. Previous work up for abdominal pain over the past 10 years included two positive fecal occult blood screens with negative endoscopy and colonoscopy, unremarkable abdominal ultrasound, abdominal CT scan, and negative stool ova and parasites. Hematocrit ranged from 38 to 41 during this time period. The patient's social history was significant for immigration from a rural area in the Minas Gerais region of Brazil 20 years prior to presentation, without having ever returned to Brazil since relocating to the United States. She is employed as a housecleaner. Her family history is significant for CVA in her mother and splenectomy in two brothers from complications of schistosomiasis. On physical exam, she was noted to be a tearful, overweight woman. Faint pink papules and excoriation were noted on bilateral forearms. The remainder of the skin exam was otherwise unremarkable. Cardiac and pulmonary exams were within normal limits. Abdominal exam was notable for left upper quadrant tenderness to palpation, without notable splenomegaly. Testing for schistosomiasis with a schistosomal IgG antibody was positive at 51.81 (upper limit of normal 11.01). This assay has a sensitivity of 87 % and specificity of >95 %. She denies ever having previously been treated for schistosomiasis. The patient was treated for presumed chronic schistosomiasis with two doses of praziquantel. She reported resolution of her pruritus as well as her chronic abdominal pain within days of treatment.

DISCUSSION: Schistosomiasis is a neglected tropical disease caused by a freshwater parasitic blood fluke, which can persist long past relocation to a non-endemic area. It is a widely underreported disease, but USAID estimates more than 200 million individuals are infected with schistosomiasis worldwide. There are several species of schistosomiasis, though *S. mansoni* is endemic to Brazil. This chronic infection can present as abdominal pain, gastrointestinal blood loss, portal hypertension, and, rarely, pulmonary hypertension or neurologic disease. This patient had several typical symptoms of chronic schistosomiasis, and had several risk factors for the illness, and yet her infection went unrecognized for many years. In particular, the patient lived with household members previously diagnosed with schistosomiasis and previously lived in an endemic region. Immigrants from Sub-Saharan Africa, western South American, and southern Caribbean islands are at risk for *S. mansoni*. Kato-Katz thick stool smears have been considered the gold standard in identification of schistosome infection, though this test is insensitive in low worm burden or non-endemic areas. Screening can be performed with antibody testing, though a positive titer does not differentiate between previously treated infection and active infection. Chronic abdominal pain is a common symptom of chronic infection with schistosomiasis, but this patient's presenting complaint of pruritic dermatitis is not previously well described in the literature. It is clear that acute schistosomiasis can cause pruritus; however, this patient had no acute exposures to schistosomes. The marked temporal association between her treatment and resolution of this disabling subacute complaint makes a strong case for schistosomiasis as the cause of her dermatitis. The general internist caring for the US population should consider schistosomiasis as a cause of chronic abdominal pain in patients from endemic regions including Brazil and sub-Saharan Africa; further, physicians should consider testing in patients with atypical symptoms, including dermatologic manifestations. Failing to diagnose schistosomiasis in immigrant patients can lead to morbidity and mortality when simple and inexpensive treatment is widely available.

JARISCH-HERXHEIMER REACTION (JHR) IN THE SETTING OF SYPHILIS AND HUMAN IMMUNODEFICIENCY VIRUS (HIV) Charlie Lee²; Jessica Logan¹. ¹DC VA Medical Center, Washington, DC; ²George Washington University, Washington, DC. (Tracking ID #2192078)

LEARNING OBJECTIVE #1: Recognize the clinical features of Jarisch-Herxheimer Reaction

LEARNING OBJECTIVE #2: Prevention and management of Jarisch-Herxheimer Reaction

CASE: A 47-year-old male with HIV presented with one week of blurry vision in the left eye. He denied fevers, chills, ocular pain, confusion, and neck stiffness. He was not on anti-retroviral therapy. The patient was unable to read fine print within 1-foot length of the left eye. Ophthalmologic exam was significant for chorioretinitis of the left eye. Laboratory studies revealed a positive Serum FTA-Abs and RPR (titer 1:512). CD4+ count was 470 and HIV viral load was 39,172. Lumbar puncture was performed with cerebrospinal fluid positive for VDRL. The patient was immediately started on IV penicillin G. Within three hours, the patient endorsed rigors and chills. Vital signs showed fever, tachycardia,

and mild hypotension. Given concern for Jarisch-Herxheimer Reaction (JHR), he was moved to a medical intensive care step-down unit for aggressive supportive care. Vital signs normalized within 24 h and penicillin was continued for treatment of syphilis.

DISCUSSION: The Center for Disease Control (CDC) estimates there are approximately 55,000 new cases of syphilis in the U.S. annually. In the current HIV pandemic, management of syphilis is crucial as syphilis may increase the rate of acquisition and transmission of HIV. JHR, a complication of syphilis treatment, has been reported at rates of 10–25 % and may be as high as 50–75 % in cases of primary and secondary syphilis. It is rare in latent and late syphilis. Rates are even higher in HIV patients. JHR is mostly self-limited, but consequences include discontinuation of treatment and rarely death. Although the cause of JHR is unknown, it is proposed that release of cytokines after administration of anti-microbial agents is responsible. Commonly associated with underlying syphilis or louse-borne relapsing fever, it can also occur with non-spirochete disease including brucellosis and meningococcal septicemia. JHR occurs with numerous agents including penicillins, tetracyclines, macrolides, and sulfonamides. JHR occurs within hours to one day of administering penicillin. Clinical features include fever, tachycardia, tachypnea, and hypotension. Patients may endorse chills, myalgias, and flushing. If a syphilitic rash is present, it may worsen. Current treatment options are supportive only (anti-pyretics, fluids). Discontinuation of the treatment agent or transfer to ICU level care may be considered, although no studies exist that support these measures. Corticosteroids have been studied as pre-treatment measures for JHR and showed decreased incidence or duration of fever. However, none demonstrated a mortality benefit. United Kingdom guidelines recommend use of steroids in certain cases of neuro- and cardiac-syphilis while CDC guidelines do not endorse use of steroids. Given lack of evidence and consensus, steroids are not considered routine treatment of JHR. In patients with louse-borne relapsing fever, murine Anti-TNF- α antibodies have shown to reduce vital sign disturbances and levels of cytokines. These agents could be promising in prevention of JHR. Syphilis is a common disease that has become more important in the setting of the HIV pandemic. JHR is a complication associated with the treatment of syphilis. Although usually self-limiting, it can lead to treatment failure and death. Therefore, it is essential to recognize JHR and understand current and future management options.

KEEP A “LOOKOUT” FOR SYPHILIS Mekhala Chandra²; Sara L. Swenson¹.
¹California Pacific Medical Center, San Francisco, CA; ²California Pacific medical center, San Francisco, CA. (Tracking ID #2198454)

LEARNING OBJECTIVE #1: Recognize the importance of the sexual history and risk factors for HIV infection in diagnosing syphilitic uveitis

LEARNING OBJECTIVE #2: Screen for HIV infection in patients who present with uveitis

CASE: A 36-year-old white male with a history of high-risk sexual behavior, injection drug use, and homelessness presented to the emergency department complaining of seeing intermittent “floaters” for 10 days and acute, progressive painful vision loss over the past 4 days. His ocular exam showed mildly swollen, red lid margins and conjunctival injection with ciliary flush. His pupils were non-reactive bilaterally. Iris exam revealed bilateral posterior synechiae. Visual acuity of the right eye was 20/400, but the left eye distinguished only hand-waving. Laboratories revealed a positive RPR titre of 1:128. The FTA antibody was reactive. HIV RNA of 69,464 per ml. He was started on a 14-day course of intravenous penicillin along with oral prednisone. His vision gradually improved. He subsequently started antiretroviral therapy as an outpatient.

DISCUSSION: The recently increased incidence of ocular syphilis has stimulated interest in this old disease. In the USA, the rates of primary and secondary syphilis have doubled from 2000 to 2013: 2.1 vs 5.3 cases per 100,000. The epidemic has disproportionately affected the MSM population. Ocular syphilis is a form of neurosyphilis that can occur at any stage of *T. pallidum* infection. It may be the only clinical manifestation of disease. Although syphilis presents with a wide range of ocular manifestations, including optic neuropathy, interstitial keratitis, chorioretinitis, and retinal vasculitis, uveitis is the most common. There are no pathognomonic findings since syphilitic uveitis appears similar to uveitis from other etiologies. Syphilis accounts for fewer than 5 % of uveitis cases overall; consequently, an accurate sexual history is of paramount importance for making the diagnosis. Ocular syphilis does not require immunosuppression and should be considered in the differential diagnosis of HIV-infected patients with visual complaints regardless of their CD4 counts. In fact, one case series reported a prevalence of ocular syphilis of 9 % in HIV+ individuals. Conversely, syphilitic uveitis is a predictor of HIV infection; a recent case series found that 35 % of patients with syphilitic uveitis had undiagnosed HIV infection. In HIV-infected patients, syphilitic involvement of the eye has been shown to occur earlier than in HIV-uninfected patients. Ocular syphilis in the setting of untreated HIV is more frequently bilateral and more likely to involve the posterior chamber. Because *T. pallidum* cannot be cultured, diagnostic testing for syphilis typically consists of nontreponemal and treponemal serologic tests from the serum. Serologic tests for syphilis are occasionally falsely positive or negative in

HIV-infected patients so clinicians should pursue direct methods of diagnosis in HIV patients where a high index of clinical suspicion exists. Case series of HIV-infected individuals with ocular syphilis demonstrate excellent response to treatment with over 90 % of patients recovering at least partial vision, as did our patient. Given its potential reversibility and high prevalence in patients with known or undiagnosed HIV infection, clinicians should maintain a high index of suspicion for ocular syphilis in at-risk patients who present with unexplained visual complaints and tailor their history-taking accordingly.

KOUNIS SYNDROME—THE ALLERGIC HEART Sumant Arora¹; Ronak Patel¹; Sonali Advani²; Mario Fadila¹. ¹UAB Montgomery Health Center, Montgomery, AL; ²University of Alabama at Birmingham, Montgomery, AL. (Tracking ID #2200347)

LEARNING OBJECTIVE #1: Recognize potential of myocardial involvement in form of Kounis syndrome in suspected anaphylaxis, and include it in differential diagnosis of ischemic heart disease.

LEARNING OBJECTIVE #2: Recognize lack of standard treatment guidelines for Kounis syndrome and need for an international consensus on therapy.

CASE: A 70-year-old African American female presented with new onset breathing difficulty. She was found by her family members gasping for air and was rushed to the Emergency Department (ED) where she was emergently intubated by ED physician, who noted significant tongue and upper laryngeal swelling. Her only other complaint was worsening generalized pruritis treated with topical steroids and antihistamines. Her medical history was significant for asthma and hypertension. Her medications were notable for Naproxen, Ibuprofen, Folic acid and Hydroxyzine. An initial diagnosis of angioedema was presumed and she was treated with intravenous corticosteroids, Histamine (H1 and H2 receptor blockers. Her initial labs (complete blood count and chemistries) were within normal limits and chest x-ray showed clear lungs. Electrocardiogram (EKG) revealed sinus tachycardia with 2 mm ST-segment elevation in the inferior and lateral leads. Cardiac panel showed troponin of 5 ng/ml, CK257 units/l and CK-MB 18.2 ng/ml. An echocardiogram showed apical and septal wall hypokinesis. Patient underwent left heart catheterization, which revealed normal coronary arteries, apical, and inferior wall hypokinesis, and significantly reduced ejection fraction of 20 %. Her second and subsequent troponins elevated to a maximum of 5.6 ng/ml while the EKG changes returned to baseline. Because of hemodynamic instability, patient was started on norepinephrine drip. A diagnosis of Type I Kounis syndrome was suggested based on the concurrent occurrence of angioedema and ST-elevation myocardial infarction in the setting of normal coronary anatomy. Her subsequent labs showed elevated IgE levels of 221 IU/ml, normal C1 Esterase inhibitor, C3, C4 and Trypsin levels. By day 4 of hospitalization, she was weaned off pressors and mechanical ventilation, and her troponins trended down to normal levels. A repeat echocardiogram showed ejection fraction of 20 %. On the hospital day 8, she was discharged to rehab with a Life-vest in stable condition.

DISCUSSION: Kounis Syndrome is the concurrence of acute coronary syndromes (ACS) (angina and/or myocardial infarction) with allergic reactions (hypersensitivity, anaphylaxis or anaphylactoid reaction) due to coronary artery vasospasm caused by inflammatory mediators (histamine, neutral proteases, arachidonic acid derivatives, cytokines and chemokines) released during the allergic insult. Three variants have been recognized: type I variant in patients with normal or near normal coronary arteries, type II in those with preexisting atheromatous disease, and type III in those with coronary stent thrombosis. Various drugs, environmental exposures and conditions are implicated in causation with the most recent offenders being scombroid syndrome (histamine fish poisoning), exposure to gelofusine and the drug losartan. Clinical spectrum includes chest pain with or without elevation of cardiac enzymes and troponins along with dermatologic and/or systemic manifestations of allergic reaction. However, reported cases suggest that both signs of cardiac disease or hypersensitivity may be absent. Spectrum of ECG changes range from ST-elevation or depression to cardiac arrhythmias, but degree of ST-elevation may not necessarily correlate with troponin levels unlike that in ACS. The latter makes Kounis syndrome an easily overlooked diagnosis in the differential for ACS, without a high index of clinical suspicion. Further, there is no established way to predict the risk of Kounis syndrome, though recent reports suggest increased baseline serum trypsin levels to be associated with both increased susceptibility to allergic reactions as well as asymptomatic coronary disease. Treatment is challenging due to need to target cardiac and allergic symptoms simultaneously, as well as lack of uniform consensus on treatment guidelines with most recommendations derived from anecdotal case reports or case series. In a 2009 review of reported cases with Kounis syndrome, intravenous steroids (76 %), nitroglycerine (47 %), H1-blockers such as diphenhydramine (70 %), and H2-blockers such as ranitidine (35 %) were found as most commonly used medications in the treatment. Beta-blockers and epinephrine should be avoided in suspected case of Kounis syndrome as may exacerbate coronary spasm due to unopposed alpha- adrenergic activity. Further, opioids commonly used in ischemic heart disease can exacerbate allergic reaction by inducing

mast cell degranulation. Also, data supporting the use of prophylactic medications such as H1-blockers to avoid recurrence of such a life threatening condition is lacking.

LESSONS FROM THE PASTURE: PASTEURELLA MULTOCIDA INFECTION RESULTING FROM A HORSE HOOF INJURY Nicholas Duca; Asher Tulskey. University of Pittsburgh, Pittsburgh, PA. (*Tracking ID #21919117*)

LEARNING OBJECTIVE #1: Recognize that *Pasteurella multocida* is a common pathogen in animal-associated infection and must be considered when choosing an empiric antibiotic regimen.

LEARNING OBJECTIVE #2: Recognize that antibiotics commonly prescribed for soft tissue infections are ineffective against *Pasteurella multocida*.

CASE: A 51 year old woman with no significant medical history and an allergy to penicillin was admitted with fever, chills, and a left calf wound. Two weeks prior to presentation, the patient was stepped on by a horse while working on her farm. Three days following the injury, she presented to her local emergency department with calf pain and swelling; she was discharged with cephalexin 500 mg PO twice daily. Despite compliance with this regimen, the patient returned one week later with worsening symptoms. This time, she was prescribed clindamycin 300 mg PO three times daily. Three days into treatment, the patient developed fevers and chills, at which time she sought care at our facility. Upon admission, the patient was afebrile with normal vital signs. There was a 2 cm ovoid wound on the medial aspect of her left calf, with surrounding erythema and induration. Significant pus and coagulated blood were expressed from the wound. Using a probe, the wound tracked 7 cm both superiorly and inferiorly and 4 cm both anteriorly and posteriorly. Labs, including WBC, were unremarkable. Deep wound cultures were obtained at the bedside, and broad spectrum antibiotics including vancomycin, aztreonam, and metronidazole were initiated. MRI revealed a 5 cm×7 mm non-enhancing fluid collection consistent with fat necrosis, without soft tissue gas or osteomyelitis. On hospital day two, the patient underwent debridement of the wound with placement of a wound vac. Subsequently, wound cultures obtained upon admission and in the operating room grew *P. multocida*. The antibiotic regimen was narrowed to moxifloxacin, and the patient was discharged home. She underwent successful closure of the wound one week later.

DISCUSSION: *Pasteurella multocida* is a common gram negative bacillus present in the oral mucosa of many animals, including dogs, cats, rabbits, and as in this case, horses. The organism is typically transmitted to humans via bites. However, infection can also occur from scratches, presumably from saliva contaminated claws or hooves. Specific infections caused by *P. multocida* include cellulitis, necrotizing soft tissue infection, septic arthritis, and osteomyelitis. *P. multocida* is susceptible to a number of antibiotics including penicillins, extended spectrum cephalosporins, carbapenems, tetracyclines, trimethoprim-sulfamethoxazole, fluoroquinolones, and aztreonam. There is lack of in vitro activity of vancomycin, clindamycin, cephalexin and erythromycin against *P. multocida*. The Infectious Disease Society of America recommends amoxicillin-clavulanate for management of animal or human bite wounds. In penicillin-allergic patients, fluoroquinolones such as moxifloxacin are effective alternatives. When promptly recognized and treated, most soft tissue infections caused by *P. multocida* resolve without serious complications. In this case, it was only after failing standard outpatient treatment of cellulitis and subsequently undergoing wound debridement with positive wound cultures, that appropriate treatment was initiated. While no specific guidelines address animal scratches or licks, based on this and other case reports, it may be best to initiate empiric treatment for *P. multocida* while awaiting confirmatory cultures.

LEVAMISOLE-LACED COCAINE INDUCED VASCULITIS Rachel Kapelow. Ameral University of Antigua, Brooklyn, NY. (*Tracking ID #2160165*)

LEARNING OBJECTIVE #1: Recognize the clinical features of levamisole adulterated cocaine induced vasculitis.

CASE: A 54-year-old woman with a past medical history of chronic cocaine, marijuana, opioid abuse and a 10 pack-year smoking history presented to the ED with an increasingly painful and burning purpuric rash and skin necrosis of two days duration on her extremities, ear lobes, and cheeks. Additional history revealed that she had previous episodes of a purpuric rash, which was linked on this admission to smoking crack cocaine continuously for several days. A diagnosis of levamisole-induced vasculitis was suspected. A urine toxicology screen was positive for cocaine and marijuana. Laboratory testing showed leukopenia with a white blood cell count (WBC) of 3200 cells/mL, neutropenia with an absolute neutrophil count (ANC) of 800 cells/mm³, positive perinuclear-antineutrophil cytoplasmic antibody (p-ANCA) and increased erythrocyte sedimentation rate (ESR) of 49 mm/h. Skin biopsy of the left ear revealed leukocytoclastic vasculitis with acute and chronic inflammation and thrombosis of small vessels. Treatment of wound care was initiated with bacitracin ointment and IV methylprednisolone with which the patient

improved tremendously. Three days later, new lesions stopped appearing and expanding and the patient was discharged.

DISCUSSION: Levamisole-induced vasculitis in association with people who use cocaine is characterized by purpuric skin lesions and necrosis. Recently, there has been an increase in prevalence and it is important for physicians to be informed of this emergent entity in order to make it less challenging to diagnose. Levamisole was used as an antihelminthic medication and later withdrawn from use in the U.S. in 1999 due to its adverse effects. This case illustrates the potential adverse effects including skin vasculitis, agranulocytosis and even severe necrosis of soft tissue and cartilage. The value of a thorough history is essential to explore in patients presenting with these symptoms. Recognition of this syndrome is critical for symptomatic patients as discontinuation of exposure and a correct diagnosis prevents unnecessary, costly and potentially dangerous use of other treatment modalities.

LOIN PAIN HEMATURIA SYNDROME Jill B. Feffer; Pauline Leong. North Shore-LIJ/Hofstra School of Medicine, Lake Success, NY. (*Tracking ID #2160392*)

LEARNING OBJECTIVE #1: Diagnose loin pain hematuria syndrome as a rare cause of flank pain.

CASE: Twenty-four year-old female with no known medical history except two hospitalizations during the prior 6 months for flank pain treated for presumed pyelonephritis during which she was told she had "small kidneys," now presented with one day of severe bilateral flank pain. Her pain was chronic with intermittent flares since her first hospitalization, radiated to both groins and was associated with nausea and gross hematuria. She denied fever, chills, vomiting, dysuria, or history of nephrolithiasis. Family history was significant for paternal grandfather requiring hemodialysis for unknown reason. Of note, the patient is allergic to acetaminophen so she had been taking ibuprofen at home. On admission, the patient was afebrile, hypertensive (150 s/90s) and tachycardic (90s). Physical exam showed a young, healthy-appearing woman with severe bilateral costovertebral angle angle tenderness and no peripheral edema. Labs revealed: normal white blood count with normal differential, mild normocytic anemia (Hgb 11.2, MCV 87.7), elevated BUN/creatinine (37/2.62), normal total bilirubin, negative ANA (<1:80), normal ESR and CRP, low C3 with normal C4, urinalysis with nephritic-range proteinuria and microscopic hematuria but negative leukocyte esterase and nitrite without bacteria, urine culture growing 60,000 mixed Gram positive flora, lipid profile within normal limits, and vitamin D deficiency (17.7) with high PTH (147). CT abdomen/pelvis showed bilateral atrophic (~8 cm) kidneys without nephrolithiasis or pyelonephritis; renal ultrasound with Dopplers ruled out renal artery stenosis. Creatinine remained stable (2.3–2.6), blood pressure decreased to 120 s/70s without intervention, nausea resolved, pain was better controlled with short-acting oxycodone as needed, and hemoglobin remained stable so the patient was discharged with nephrology follow-up.

DISCUSSION: This patient's constellation of signs and symptoms did not fit common infectious or metabolic etiologies of flank pain, ultimately leading to a diagnosis of exclusion: loin pain hematuria syndrome (LPHS). Knowledge of LPHS has been gleaned from surgical and nephrology case reports because it has a prevalence of only 0.012 %, sufficiently low to preclude systematic studies. It occurs either as a self-limited primary condition without compromised renal function or secondary to underlying medical renal disease, typically IgA nephropathy. Our patient's atrophic kidneys and CKD, as evidenced by imaging and findings of secondary hyperparathyroidism, support the diagnosis of secondary LPHS. Biopsy was not performed due to renal atrophy. Pathogenesis is unknown but has been postulated to be of either immunologic or vascular etiology and has been associated with somatoform disorders. Clinical manifestation involves intermittent flares of chronic flank pain which radiates to the groin, unilateral more commonly than bilateral, associated with nausea and hematuria. This rare condition is therefore difficult to distinguish from pyelonephritis. Treatment currently consists of pain management, while extreme cases have been treated with experimental modalities including stripping of the affected renal capsule or autonephrectomy with reimplantation.

LOOK BEYOND THE HEART: ACUTE PANCREATITIS MIMICKING STEMI Sonali Advani²; Sumant Arora¹; Jewell Halanach². ¹UAB Montgomery Health Center, Montgomery, AL; ²University of Alabama at Birmingham, Montgomery, Montgomery, AL. (*Tracking ID #2200129*)

LEARNING OBJECTIVE #1: To understand that acute pancreatitis may be associated with electrocardiographic and biochemical abnormalities similar to acute myocardial infarction.

LEARNING OBJECTIVE #2: It is initially important to rule out cardiac ischemia in these patients if they have electrocardiographic and biochemical evidence of myocardial damage.

CASE: A 34-year-old African American man with no past medical history presented to the Emergency Room (ER) at an outside hospital with severe abdominal pain and flu like symptoms- fevers, chills and body aches for 2 days. He was prescribed antihistamines with antibiotics and discharged home the same day. He failed to take these medications at home and continued to run a fever with chills (Tmax 103 F). Over the next 3 days, his abdominal pain increased in severity and he became nauseated and diaphoretic. He also developed crushing chest pain, 8/10 in intensity, radiating to his left axilla, associated with shortness of breath at rest, 3-pillow orthopnea and palpitations. He returned to the outside hospital the following night. His initial blood work in the ER revealed elevated troponins (4 mg/dl) and lipase levels over 4000. His electrocardiogram (EKG) at that time showed ST segment elevation in the inferior leads 2, 3 and aVF. He was transferred to our hospital for further management. On arrival to our ER, he was febrile with Tmax 101.8 F, with a blood pressure of 108/60 mm Hg, heart rate of 95 beats/min, respiratory rate of 24 breaths/min and normal oxygen saturation. He was a tall well-developed male who appeared anxious, diaphoretic and in severe distress from pain. Lung fields were clear to auscultation, while cardiac exam revealed normal heart sounds, tachycardia with regular rhythm and absence of murmurs rubs or gallops. There was no evidence of pericardial friction rub. Abdominal exam revealed increased tenderness in epigastric and left quadrant with guarding, and absent bowel sounds. The rest of the physical examination was unremarkable. Chest X-ray and abdominal ultrasound were unremarkable. The 12-lead ECG recorded in our ER sinus tachycardia with ST-segment elevations in leads 2, 3 and aVF. His serial troponins drawn were 2.9 mg/dl and 1.8 mg/dl. Serum electrolytes were normal with C Reactive Protein of 15.69 mg/dl, and creatine phosphokinase of 278 U/L. Lipid profile revealed total cholesterol of 153 mg/dl, LDL of 86 mg/dl, HDL of 43 mg/dl and triglycerides 106 mg/dl. An echocardiographic examination at the bedside disclosed left ventricular ejection fraction of 65 % without any wall motion abnormalities, diastolic dysfunction or hypertrophy. Cardiology was consulted and he underwent an emergent diagnostic coronary angiography, which revealed no evidence of obstructive coronary disease. His initial lipase was 2157 U/L and repeat lipase was 3817 U/L. Abdominal computed tomography scan revealed some peripancreatic stranding consistent with acute pancreatitis. We treated him as acute pancreatitis, kept him N.P.O., hydrated him with IV fluids, and managed his pain and nausea symptomatically. We also ordered Immunoglobulin G4 levels to rule out autoimmune pancreatitis, which was also normal. Over the next 2-3 days, his pain started to subside and appetite improved. We started him on clear liquid diet and advanced him slowly to a regular diet. He was discharged home in stable condition and his post discharge course was unremarkable.

DISCUSSION: Electrocardiographic changes of acute myocardial infarction in patients with acute pancreatitis have been documented before. Similar changes have also been documented in some patients with myocarditis, cholecystitis, chest trauma, pneumonia and CNS injury. Various hypotheses have been formulated to explain underlying mechanisms of electrocardiographic abnormalities and/or biochemical changes in these conditions. These include proteolytic effects of pancreatic enzymes in addition to (vasoactive substances such as prostaglandins and bradykinins) on myocardium, cardio-biliary reflex, vagal coronary artery spasm, metabolic and electrolyte abnormalities, hemodynamic instability and systemic inflammatory response-induced cardiac damage. In patients who present with electrocardiographic and biochemical evidence of myocardial damage, it is initially important to rule out cardiac ischemia. But we must maintain a high clinical suspicion of other conditions mimicking acute MI to avert complications of antithrombin and antiplatelet therapy. These agents are contraindicated in at least some conditions mimicking STEMI and those requiring surgery. There are reports of antithrombin and antiplatelet therapy causing hemorrhagic pancreatitis, aortic dissection, subarachnoid hemorrhage and death in these cases. In conclusion, acute pancreatitis may be associated with electrocardiographic and biochemical abnormalities similar to acute myocardial infarction. The timely and correct diagnosis of such these conditions is critical since they can adversely affect the clinical outcome.

LYME CARDITIS Shilpa Mukunda. Boston Medical Center, Boston, MA. (Tracking ID #2198766)

LEARNING OBJECTIVE #1: Recognize early Lyme disease

LEARNING OBJECTIVE #2: Diagnose and manage first degree AV block from Lyme carditis

CASE: Thirty-three year old male with no significant past medical history presents with new onset of palpitations. Six weeks ago, the patient had gone on a hiking trip in New Hampshire, during which he had not noticed any ticks. Three weeks later, he had presented to urgent care with fevers to 102 and a pruritic, circular lesion in his left popliteal area. He was diagnosed with cellulitis (Lyme IgG and IgM were negative at this time) and given a one week course of cephalexin. After two more weeks, he had re-presented to his primary care doctor due to persistent myalgias, arthralgias, and low-grade fevers. At this time, the diagnosis of Lyme disease was made with positive Lyme EIA to 2.1 with confirmatory positive Western blot for both Lyme IgG and IgM antibodies, and the patient was started

on doxycycline 100 mg BID. The patient's current complaint was a new onset of transient palpitations, which started the day after he had been diagnosed with Lyme disease. The patient reported feeling uncomfortable with the palpitations, but denied chest pain, shortness of breath, syncope, or dizziness. Physical exam revealed tachycardia and hyperpigmentation in the left popliteal fossa at the site of his former rash. EKG showed sinus tachycardia with 1st degree AV block with PR of 336 msec. The patient was admitted to the hospital and started on IV ceftriaxone 2 g daily. His PR interval decreased through admission to 320 ms on day 2 and 288 ms on day 3. He remained asymptomatic through admission without palpitations. He was discharged on PO amoxicillin 500 mg TID for a total 28-day course.

DISCUSSION: Lyme disease, caused by the spirochete *Borrelia burgdorferi*, is the most common vector-borne disease in the United States and Europe.¹ This patient initially presented with fevers and a pruritic rash, which was misdiagnosed as cellulitis. His rash was likely erythema migrans, which is the most common sign of early localized infection in Lyme disease.² Erythema migrans is a rapidly expanding, erythematous skin lesion that appears at the site of the tick bite 1-2 weeks later.² The diagnosis of erythema migrans should be based on the clinical history, including potential exposure to ticks, and physical exam.³ Importantly, serologic tests for antibodies *B. burgdorferi* are not useful in patients with erythema migrans during the acute phase, as false negative results, as seen in this patient, occur in up to 50 % of cases.² While cellulitis is in the differential diagnosis for patients with erythema migrans and both can be warm and erythematous, cellulitis is often at the site of trauma to skin, usually tender, and is rarely circular.³ Days to weeks after the onset of erythema migrans, *B. burgdorferi* spreads hematogenously to other sites.¹ This stage, known as early disseminated infection, is often accompanied by headache and myalgias¹, and includes extracutaneous manifestations such as neurologic and cardiac complications.³ Most cases of Lyme carditis are clinically asymptomatic, though some patients present with palpitations, syncope, and chest pain.⁴ While Lyme disease affects men and women equally, Lyme carditis is more common in men with a ratio of 3:1.⁴ The most common cardiac abnormality is heart block. Patients with minor cardiac involvement, defined as 1st degree AV block and PR interval <0.3 s, can be treated orally with doxycycline or amoxicillin.⁵ Patients with PR interval greater than 0.3 s have a higher risk of developing complete heart block, a progression that can occur in minutes.⁵ For this reason, patients with first degree AV block with a PR>0.3 s, as well as those with second or third degree block, should be hospitalized and treated with IV ceftriaxone 2 g daily or high dose penicillin G.⁵ Complete recovery of Lyme carditis is seen in 90 % of patients.⁵ After advanced heart block resolves, treatment can be completed with an oral agent, such as doxycycline or amoxicillin, for a total 21-28 day course.² This patient had complete recovery from his carditis and has had no further sequelae from his Lyme disease. 1. Steere AC. Chapter 173. Lyme Borreliosis. In: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson J, Loscalzo J, eds. Harrison's Principles of Internal Medicine, 18e. New York, NY: McGraw-Hill; 2012. <http://accessmedicine.mhmedical.com.ezproxy.bu.edu/content.aspx?bookid=331&Sectionid=40726926>. Accessed September 28, 2014. 2. Shapiro, E. D. Lyme Disease. N. Engl. J. Med. 370, 1724-1731 (2014). 3. Wormser, G. P. Early Lyme Disease. N. Engl. J. Med. 354, 2794-2801 (2006). 4. Rostoff, P. et al. Lyme carditis: Epidemiology, pathophysiology, and clinical features in endemic areas. Int. J. Cardiol. 144, 328-333 (2010). 5. Lelovas, P., Dontas, I., Bassiakou, E. & Xanthos, T. Cardiac implications of Lyme disease, diagnosis and therapeutic approach. Int. J. Cardiol. 129, 15-21 (2008).

LYME CARDITIS: PAUSE IT! Kamran Hassan, california pacific medical center, San francisco, CA. (Tracking ID #2183864)

LEARNING OBJECTIVE #1: Lyme carditis can cause heart blocks from the more common AV node blocks to the rare SA node blocks.

LEARNING OBJECTIVE #2: Sinus node arrest if recognized and managed appropriately with antibiotics, may negate the need for permanent pacer placement.

CASE: The patient is an 81-year-old Caucasian male with history of hyperlipidemia, BPH and SCC who presented with recurrent episodes of dizziness occurring once or twice a week for about a month with one episode of loss of consciousness. Of note, he reported a rash around his waist about 2 months ago. He did not recall any insect bites. The physical examination at the time of admission and his initial labs were unremarkable except for an elevated D-Dimer. A CTA was done and ruled out pulmonary embolism. During his admission, he endorsed episodes of lightheadedness which correlated with multiple sinus pauses on telemetry lasting about 5-6 s each. A temporary pacer was placed and intravenous ceftriaxone was started for the treatment of possible Lyme carditis. His sinus pauses decreased in number and eventually stopped over the next few days. Later, his western blot returned positive for Lyme disease. On Day 6 the patient was discharged on oral Doxycycline without a permanent pacer.

DISCUSSION: Lyme disease or Lyme borreliosis is the most commonly reported vector-borne disease in the United States. It is caused by the spirochete *Borrelia burgdorferi* and transmitted to humans by the bite of Ixodes tick. Lyme carditis is a relatively uncommon

sequelae in 4–10 % of the patients with untreated Lyme disease and occurs about 1–2 months after the primary infection. Although all layers of the heart can be affected; most common cardiac manifestations are tachyarrhythmia, myopericarditis and various conducting defects. A hypothesis supporting these heart blocks is the possible dissemination of spirochetes and inflammatory cell infiltration in the conductive tissue of the heart. Majority of the conduction defects are secondary to involvement of the AV node with only two documented cases of sinus node involvement to our knowledge. The usual symptoms include chest pain, shortness of breath, palpitation, lightheadedness and syncope. Alternating bradycardia with tachycardia is a common EKG finding with a rapid progression from first degree to complete heart block in some cases. The diagnosis of Lyme carditis is by detection of Lyme antibodies by ELISA and western blot. The management of Lyme carditis is based on the degree of heart block and the prolongation of the PR interval with higher degree of blocks requiring intravenous antibiotics with or without temporary/permanent pacer placement. Our patient had a rare presentation of Lyme disease with sinus node involvement that was adequately treated with antibiotics negating the need for permanent pacer placement.

MAD AS A HATTER: A PUZZLING CASE OF ACUTE DELIRIUM
Nivedita Gunturi; Eric Anish. University of Pittsburgh, Pittsburgh, PA. (*Tracking ID #2195128*)

LEARNING OBJECTIVE #1: 1. To recognize the signs and symptoms of anticholinergic toxicity, even in the absence of an obvious history of anticholinergic drug use.

LEARNING OBJECTIVE #2: 2. To appreciate the potential systemic effects of certain topical medications.

CASE: We present the case of an 89-year-old female with a past medical history of atrial fibrillation on warfarin, hereditary deafness, sick sinus syndrome with dual chamber pacemaker placement, hypothyroidism, traumatic brain injury following a fall and subsequent subdural hematoma, mild cognitive impairment, migraines and depression who presented to our emergency department from an assisted living facility with delirium. Until the day prior to admission, the patient had been at her baseline and able to complete ADLs, converse with facility staff and her family, and follow commands. After returning from lunch with her family and a routine optometrist appointment, she seemed irritable to the staff at the assisted living facility. She continued to become more agitated and combative and was brought to the emergency department for evaluation. Her regular medications included diltiazem, donepezil, escitalopram, furosemide, levothyroxine and warfarin. There had been no recent changes. The patient had no significant travel or ingestion history, and no history of sick contacts. Upon arrival to the emergency department, her vital signs were unremarkable. Physical exam revealed an agitated, combative elderly woman who appeared her age, with equal and reactive pupils, flushed face, irregular heart rhythm with no murmurs, clear lungs to auscultation, mildly distended but soft abdomen and spontaneous movement of all extremities. Reflexes were 3+ throughout. The patient could not follow commands due to agitation. No meningeal signs were elicited. Lab work was significant for WBC 11.4 with 88.4 % PMNs, INR 1.9, and negative troponin. Ammonia, TSH and vitamin B12 levels were all within normal limits. Urine toxicology screen for drugs of abuse was negative. Blood salicylate and ethanol levels were negative. Electrocardiogram revealed rate-controlled atrial fibrillation with intermittent ventricular pacing. Chest x-ray and head CT scan with and without contrast were unremarkable. The patient was catheterized for 700 cc of foul smelling urine with unremarkable urinalysis. Blood and urine cultures collected at that time were subsequently negative for infection. The patient received 10 mg of intramuscular olanzapine in the emergency department and was subsequently somnolent throughout the rest of the night. The patient was admitted to the geriatric medicine service and monitored overnight. Neurology service was consulted and an electroencephalogram was obtained. This showed left temporal sharp waves and seizure tendency in the region corresponding to her previous head trauma, but no acute seizure activity. Upon awakening the next morning, the patient was back to her baseline mental status, conversational and able to follow commands. Further conversation with the patient and her family revealed that during the optometry appointment the previous day, she had received ophthalmic tropicamide drops for pupillary dilation. In the absence of laboratory, radiographic or clinical evidence of other reasons for the patient's acute change in mental status, it was presumed that this patient's delirium was due to the anticholinergic effect of the cycloplegic eye drops.

DISCUSSION: This case illustrates the adverse systemic effects that can result from the use of anticholinergic ophthalmic agents, particularly in an elderly patient with underlying dementia. The patient's acute urinary retention and delirium point to a diagnosis of anticholinergic toxicity. In this case, it is also possible that the patient's post-dilation blurred vision, combined with her hearing impairment, resulted in further sensory deprivation, contributing to her delirious state. Although systemic anticholinergic effects are more likely with homatropine than with tropicamide, they can be seen with the latter as well. For the conscientious primary care practitioner, it is important to be aware of the potential for such side effects to occur, in order to counsel patients appropriately. This case

also demonstrates the importance of obtaining additional history from other sources when the patient is unable to provide reliable information.

MAKE THE DIAGNOSIS: ANTISYNTHEASE SYNDROME Emma Johns. Emory University, Atlanta, GA. (*Tracking ID #2196243*)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of antisynthetase syndrome.

LEARNING OBJECTIVE #2: Appreciate the importance of the physical exam in establishing a unifying diagnosis.

CASE: A 36 year-old female with untreated hypertension presents with a complaint of worsening shortness of breath for 6 months. She reports being unable to walk twenty feet, rise from a seated position, and unload trucks for her job. She had difficulty getting out of the ambulance without assistance. She felt some improvement with her daughter's albuterol inhaler. She has a 10 year smoking history but quit smoking two years ago. On admission, she was afebrile and her oxygen saturation was 94 % on room air. Crackles were noted at the right lung base. There were no murmurs, jugular venous distension, or edema. She had normal sensation. Strength was 4/5 bilaterally in biceps, triceps, deltoids, quadriceps, and hip flexors but 5/5 in distal muscle groups. Her initial labs showed mild transaminitis (AST of 112, ALT of 116) and microcytic anemia. D-dimer was 478, BNP was 16, and CK-MB was 134. Chest radiograph showed diffuse bilateral reticulonodular pattern. A chest CT chest showed bilateral enlarged axillary lymph nodes, cardiomegaly, scattered ground glass opacities, and traction bronchiectasis throughout the bilateral lungs. Ventilation-perfusion scan was negative for pulmonary embolus. Pulmonary function tests (PFTs) revealed a restrictive pattern and a reduced diffusion capacity, consistent with an interstitial lung disease. Her echocardiogram showed a normal left and right ventricular systolic function and stage I-II left ventricular diastolic dysfunction. Transbronchial lymph node biopsy showed chronic inflammation of the bronchial mucosa. Further lab testing revealed an elevated CPK at 4375, sedimentation rate of 22, and CRP of 2.97. Antibody testing found a positive Anti-SSA and Anti-Jo1. Anti-dsDNA, anti-centromere, anti-Smith, anti-SSB/La, and anti-Scl70 were all negative. An electromyogram (EMG) showed an irritable myopathy. She was diagnosed with antisynthetase syndrome with polymyositis and interstitial lung disease. She was treated with prednisone 30 mg twice daily with a plan to start azathioprine as an outpatient.

DISCUSSION: Antisynthetase syndrome is a rare systemic autoimmune syndrome. It is thought to involve an immune reactivity towards tRNA synthetases that may be involved in the inflammatory response in muscle or lung. Diagnosis requires the presence of antisynthetase antibodies and the presence one or more of characteristic clinical features including interstitial lung disease, inflammatory myopathy, and inflammatory polyarthritis. Initially, interstitial lung disease may be the only manifestation and more severe disease may develop over time. Anti-Jo1 antibody is associated with antisynthetase syndrome. Other helpful tests include CPK, EMG, PFTs and biopsy. In this case, the patient had findings consistent with interstitial lung disease on pulmonary testing. However, other clues including proximal muscle weakness, elevated CPK, and inflammatory biomarkers prompted an evaluation for a systemic autoimmune process. The myopathy on EMG and a positive anti-Jo1 antibody helped confirm the diagnosis. Our case illustrates the crucial role of a thorough history and physical exam. Although this patient's chief complaint was shortness of breath, her functional limitations were due to both dyspnea and weakness. Upon further questioning, she specifically felt weak when rising from a seated position and trying to arrange her hair, classic symptoms of pathologic proximal muscle weakness. Decreased strength on physical exam corroborated that history. It is easy to overlook strength deficits as poor effort or exertional limitations from another disease process. In this case, strength was the key to the diagnosis, which was then confirmed with serologies. Given the heterogeneity of polymyositis and antisynthetase syndrome, it is vital to remember that interstitial lung disease is not always a diagnosis in and of itself; it can also be a sign of a systemic illness that the physical exam can be effective and efficient in helping to diagnose.

MALIGNANT PERITONEAL MESOTHELIOMA PRESENTING AS FEVER OF UNKNOWN ORIGIN Avash Kalra¹; Nate Schomaker¹; Frank W. Merritt². ¹University of Colorado, Denver, CO; ²University of Colorado, Aurora, CO. (*Tracking ID #2199483*)

LEARNING OBJECTIVE #1: Develop an effective clinical approach to fever of unknown origin in the setting of intra-abdominal fibrosis

LEARNING OBJECTIVE #2: Diagnose malignant peritoneal mesothelioma, while recognizing the potential for sampling error associated with surgical biopsy

CASE: A 35-year-old Caucasian male with no significant past medical history presented with a six month history of daily fevers, night sweats, unintentional 40-lb weight loss, fatigue, and constant periumbilical abdominal pain. He reported no risk factors for exposure to tuberculosis or other atypical infections. Evaluation at another hospital was notable for elevated erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), as well as marked thrombocytosis. Magnetic resonance imaging (MRI) of the abdomen revealed fibrosis in the peritoneal and mesenteric soft tissues, and an upper endoscopy showed mild esophagitis. The patient underwent an exploratory laparotomy that included four tissue biopsies of peritoneum and omentum that all revealed non-specific fibroadipose tissue without evidence of malignancy. At the time of transfer from the outside hospital, the patient appeared cachectic, was febrile to 39.0°C, and tachycardic to 110 beats per minute. His abdomen was soft and mildly tender throughout, with no palpable masses. The patient underwent a thorough evaluation for infectious, rheumatologic, hematologic, and malignant causes. Briefly, autoimmune markers (including auto-antibodies and immunoglobulin levels) and a panel of infectious disease markers were negative. A computerized tomography (CT) scan of the head and chest was also unrevealing, and bone marrow biopsy revealed normal cellularity without dysplasia or abnormalities on flow cytometry. With continuing symptoms, the patient underwent a whole-body positron emission tomography (PET)-CT scan which showed intense uptake of FDG, a radiopharmaceutical that correlates with high metabolic activity, throughout the omental, mesenteric, and peritoneal soft tissues and associated peritoneal calcifications. Subsequently, the patient underwent repeat exploratory laparotomy, with repeat biopsies, which on pathology review were consistent with diffuse malignant peritoneal mesothelioma (MPM). After surgical consultants determined that the extensive abdominal tumor burden would not be amenable to debulking, chemotherapy with carboplatin and pemetrexed was initiated shortly before the patient was discharged home.

DISCUSSION: General internists commonly encounter fever of unknown origin (FUO), a clinical entity defined by fever greater than 38.3 °C for at least three weeks and an unrevealing evaluation over at least one week. Infections, malignancies, and connective tissue disease comprise the majority of diagnosed cases of FUO, but up to 50 % of cases do not reveal a diagnosis. Thorough history-taking, hypothesis-based laboratory testing, and even CT scanning of the chest and abdomen are encouraged diagnostic methods. Data have also suggested that FDG-PET can be a valuable imaging technique, as it was in this case, for the general patient population with FUO and an elevated ESR or CRP. This case describes the presentation of a rare malignancy in a young male who presented with FUO. The initial differential diagnosis included rheumatologic, hematologic, oncologic, and infectious etiologies, and the eventual diagnosis of primary MPM was made only after repeat biopsies of fibrotic peritoneal and omental tissues. Indeed, this FUO case included the added complexity of diffuse intra-abdominal fibrosis, which raised suspicion for malignancy. Malignancies to consider include carcinomatosis, mesothelioma, lymphomatosis, and sarcomatosis. Although these conditions can exhibit some characteristic imaging findings - for instance, presence of hemorrhage (sarcomatosis), significant ascites (carcinomatosis), calcification of plaques (mesothelioma), or focused lymphatic involvement (lymphomatosis) - imaging is rarely diagnostic on its own. When initial biopsy results are non-diagnostic, it is important to consider sampling error. In this case, with diagnostic uncertainty persisting after the first set of biopsy specimens, intense FDG uptake on PET-CT within areas of fibrosis provided objective support for pursuing repeat biopsies. This patient's presentation adds to the current literature of primary MPM, the most frequent malignancy of the peritoneum but a rare malignancy overall that is diagnosed only about 250 times in the U.S each year. Median survival based on cancer registry data suggests a median survival of 10 months. Exposure to asbestos, the most commonly recognized risk factor for this malignancy, was not identified in the patient's history. When debulking surgery is not an option, chemotherapy is carboplatin-based and is usually palliative. This patient's case was typical in that he presented non-specifically and at a late stage of diagnosis, reflecting a need for a high index of suspicion in appropriate circumstances.

MALIGNANT PLEURAL MESOTHELIOMA PRESENTING AS AN ENIGMATIC PLEURAL EFFUSION Priyanka Parekh²; Sujata Bhushan¹. ¹Dallas VA Medical Center, Dallas, TX; ²University of Texas Southwestern, Dallas, TX. (Tracking ID #2189043)

LEARNING OBJECTIVE #1: Diagnose and manage a suspected malignant pleural effusion (MPE). Occasionally fluid studies and cytology are unrevealing and further invasive measures must be taken for definitive diagnosis. Once diagnosed, the management of MPE is usually palliative and chosen based primarily on the the patient's expected survival time.

LEARNING OBJECTIVE #2: Recognize malignant mesothelioma as a rare etiology of malignant pleural effusion (MPE).

CASE: Fifty-two year old Caucasian male with past medical history of COPD, left spontaneous pneumothorax, status post chemical and mechanical pleurodesis with left upper lobe resection, was admitted with a 3 week history of progressive dyspnea on

exertion, left-sided pleuritic chest pain and a nagging dry cough. His occupational history was notable for working in construction in the Navy shipyards, and social history was notable for heavy tobacco use. Physical exam was significant for decreased breath sounds and dullness to percussion of the left lung base. Chest radiography revealed an opacified left lower lobe. Computed tomography confirmed the presence of a large loculated left-sided pleural effusion with rightward mediastinal deviation. The patient underwent thoracentesis with chest tube placement, with subsequent drainage of three liters of grossly bloody fluid, exudative by Light's criteria. Gram stain and culture of the pleural fluid were negative. Cytopathology of the fluid was sent twice, including PAP stain, and was negative for malignant cells. The patient subsequently underwent video-assisted thoracoscopic surgery with pleural biopsy, and placement of a thoracic irrigation system with chest tubes and an indwelling pleural catheter. During the surgery he was noted to have thick pleural studding with tumor. Histopathology revealed a myxoid neoplasm, most consistent with a diagnosis of malignant pleural mesothelioma (MPM).

DISCUSSION: The first step in both diagnosis and management of a suspected malignant pleural effusion (MPE) is thoracentesis for pleural fluid analysis as well as relief of dyspnea. MPEs are typically exudative; the presence of low pH and/or low glucose suggests high tumor burden. MPEs are commonly lymphocyte-predominant, and can be grossly bloody. While these features of pleural fluid analysis are suggestive of MPE, the definitive diagnosis depends on the detection of tumor cells via pleural fluid cytopathology or pleural biopsy histopathology. The sensitivity of pleural fluid cytology to detect malignant cells is suboptimal, estimated at 40–87 %. Serial thoracenteses for repeated cytologic analysis, as well as the addition of immunohistochemistry staining detecting various tumor markers, have both been proposed to increase sensitivity of this diagnostic strategy. However, in many cases, a more invasive diagnostic procedure—such as CT-guided closed pleural biopsy, medical thoracoscopy, or video-assisted thoracoscopic surgery (VATS)—to obtain a histologic biopsy is required to make the diagnosis. The use of medical thoracoscopy in particular raises diagnostic sensitivity to 95 %. The development of MPE implies diffuse metastatic spread of the primary cancer. Prognosis depends on many factors, most notably the underlying tumor type; however, survival typically does not exceed 12 months. Therefore, management strategies are most commonly aimed at symptom relief rather than tumor eradication. Therapeutic options for MPE include observation with as-needed serial thoracenteses, indwelling pleural catheter, chemical pleurodesis, and pleuroperitoneal shunt. The choice of intervention is primarily dependent on the patient's expected survival time, with the goal of treatment being to maximize symptom relief and to minimize hospital days as well as procedure-related pain, discomfort, and complications. Most MPEs are caused by metastases from primary lung, breast, or ovarian cancers, or from lymphomas. A rare but steadily increasing cause of MPE is malignant pleural mesothelioma (MPM), an insidious neoplasm arising from the mesothelial lining of the parietal and visceral pleura. Exposure to asbestos is a well-known important etiologic factor. Pleural fluid cytology has a poor diagnostic yield of 20–33 %. Immunohistochemical markers like calretinin, WT-1, vimentin and cytokeratin 5/6 are routinely employed, but have inadequate sensitivity and specificity. In most cases, pleural biopsy via VATS is required to make the diagnosis, with a reported diagnostic sensitivity of 87 %. Although MPM is uniformly fatal at an average of 9–17 months, promising increases in survival have been reported with the use of aggressive multimodality treatment regimens that combine surgical resection with radiation, chemotherapy, or both. Maintaining a high index of clinical suspicion may result in an earlier diagnosis and a more successful treatment outcome.

MANAGEMENT OF SEVERE HYPERTRIGLYCERIDEMIA IN ACUTE ALCOHOLIC PANCREATITIS Payel J. Roy¹; Robert Lowe². ¹Boston University Medical Center, Boston, MA; ²Boston University School of Medicine, Boston, MA. (Tracking ID #2197430)

LEARNING OBJECTIVE #1: Evaluate the differential diagnosis of acute pancreatitis.

LEARNING OBJECTIVE #2: Assess conventional treatment options for hypertriglyceridemic pancreatitis and their applicability to alcoholic pancreatitis with severe hypertriglyceridemia.

CASE: Mr. S is a 44 year-old male with past medical history significant for uncomplicated acute alcoholic pancreatitis diagnosed 2 months earlier that was medically managed. Mr. S re-presented with severe epigastric pain radiating to the mid-back with associated nausea and vomiting. He endorsed drinking 6–8 beers daily for the last 2 weeks and 10 beers earlier on day of admission. He also endorsed eating multiple cheeseburgers and sausages at a friend's picnic. Examination revealed a pulse of 110 and blood pressure of 164/110. The patient was an alert and oriented middle-aged man in severe distress. He had a tender abdomen without peritoneal signs and no evidence of pleural effusion on lung exam. Initial labs were significant for a normal leukocyte count, BUN, and lactate level, and for a total bilirubin of 0.2 mg/dL and lipase 382 U/L (upper limit of normal 81 on laboratory scale), meeting criteria for acute pancreatitis. His bedside index for predicting severity in acute pancreatitis (BISAP) score was 0. He was initially managed on the medical ward for

alcoholic pancreatitis with bowel rest, normal saline infusion, and intravenous pain control. A lipid panel obtained later revealed a triglyceride level of 1425 mg/dL; repeat was 1605 mg/dL. The patient was started on gemfibrozil and urgently transferred to the MICU for initiation of an insulin drip, with a goal of titrating to a triglyceride level of less than 500 mg/dL.

DISCUSSION: This case highlights the importance of considering a broad differential in acute pancreatitis and of recognizing and managing severe hypertriglyceridemia. Mr. S had a prior presentation for presumed alcoholic pancreatitis without a lipid panel checked at that time. Potential etiologies for acute pancreatitis in Mr. S included gallstones (unlikely with a normal bilirubin) and alcohol ingestion, with hypertriglyceridemia, hypercalcemia, drug-induced, autoimmune, and infection much less likely. It is unclear if Mr. S had alcoholic pancreatitis associated with severe hypertriglyceridemia or if he truly had hypertriglyceridemic pancreatitis, a somewhat rare disease. The management of the former is uncertain, as severe hypertriglyceridemia is not necessarily seen, nor are triglyceride levels always checked, in acute alcoholic pancreatitis. In addition, the management of hypertriglyceridemia in pancreatitis without an insulin drip, apheresis, or heparin infusion is not well-documented in the literature, particularly in patients with alternate possible etiologies for pancreatitis. Mr. S was managed with conventional treatment for hypertriglyceridemic pancreatitis; however his more likely diagnosis was alcoholic pancreatitis complicated by severe hypertriglyceridemia given his lack of a family or personal history of hypertriglyceridemia. Conventional treatment of hypertriglyceridemic pancreatitis includes apheresis, insulin drip, and/or heparin. Apheresis is indicated for patients with lactic acidosis, hypocalcemia, and organ system dysfunction. An insulin drip is indicated where apheresis is not available and if the serum glucose is >500 mg/dL. Heparin infusion is less commonly used, but may be effective in lowering triglyceride levels acutely. Oral antihyperlipidemic medications should be initiated as adjuvant therapy, though their action is significantly slower. Early recognition and management of severe hypertriglyceridemia in pancreatitis is important in order to prevent complications of pancreatitis, including pseudocysts, organ failure, hemorrhage, infection, and necrosis. Mr. S was treated for alcoholic pancreatitis with severe hypertriglyceridemia using an insulin drip; however it is unclear if he had alcoholic pancreatitis as opposed to primary hypertriglyceridemic pancreatitis. More studies will be needed to determine the cost-effectiveness of checking triglyceride levels on all cases of acute pancreatitis and to determine if all cases of severe hypertriglyceridemia in the setting of presumed alcoholic pancreatitis should be managed similarly to hypertriglyceridemic pancreatitis.

MARCHIAFAVA-BIGNAMI DISEASE: A CASE REPORT WITH GOOD PROGNOSIS Michelle Tong; Violetta Laskova. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2197592)

LEARNING OBJECTIVE #1: Recognize clinical features of Marchiafava-Bignami disease

LEARNING OBJECTIVE #2: Broaden differential for neurological deficits in malnourished alcoholics

CASE: Sixty-eight year old male presents with 3–4 days of abrupt onset of generalized weakness, shortness of breath and fever/chills. He has a history of chronic alcohol abuse with 2–5 drinks 3–5 days per week, last used 4 days prior to admission. He denied any prior withdrawal from alcohol, seizures, or loss of consciousness. He is HIV positive on ART with CD4 count 636 and has ischemic cardiomyopathy with EF 48 %. On physical examination, vitals showed temperature 101.3 F, HR 74, BP 121/67, RR 20, oxygen saturation 98 %. He appeared chronically ill and cachectic with temporal wasting. He had soft crackles of the left lower lobe on respiratory exam, regular rate and rhythm without murmurs on cardiac exam, and no edema or JVD. Strength of all extremities was intact with no focal neural deficits. On initial workup, chest X-ray demonstrated left lower lobe infiltrate and CBC was significant for WBC 19.4. Patient was started on antibiotics and admitted for community acquired pneumonia. The second day of admission, patient was found to have acute onset slurred speech, ataxia, and aggressive behavior. He was alert and oriented, with fluent severe dysarthria, able to follow commands, read, repeat, and name objects. Cranial nerves were intact, motor strength and sensation of all extremities were intact and symmetric. Moderate dysmetria of upper extremities was found on finger to nose exam, he was able to perform heel to shin testing bilaterally. Gait was wide-based and unsteady with truncal titubation. Initial differential included cerebrovascular event, and stroke workup was initiated with non-contrast CT head, which was negative. MRI brain found abnormal high T2 signal arising from the splenium of the corpus callosum with no mass effect or surrounding edema. The genu and body of the corpus callosum had relatively normal signal intensity. Based on the brain MRI and physical findings, Marchiafava-Bignami disease (MBD) was diagnosed, and the patient was started on IV thiamine 500 mg TID for 3 days, then 100 mg PO daily until discharge. Patient's gait and speech improved daily on thiamine and he was discharged five days after thiamine was started with full recovery.

DISCUSSION: MBD is defined by demyelination or necrosis of the corpus callosum, first identified post-mortem in three alcoholic men in 1903 by pathologist Marchiafava and Bignami. The disease often features acute or subacute findings of dysarthria, ataxia, and in more severe cases, dementia, seizure and coma. In vivo diagnoses of MBD via MRI have allowed for earlier detection and treatment of this rare disease. By 2001, over 250 cases had been reported since the disease was first documented, mostly as post-mortem diagnoses. Since 2001, less than a hundred cases have been identified in the literature based on a computerized review, mainly diagnosed on imaging. In 2004 Heinrich et al. further subdivided the disease into Type A and Type B based on clinicoradiologic data. Type A involves the entire corpus callosum on MRI and is characterized by severe impairment of consciousness, including coma and seizure, and is associated with poor prognosis. Type B partially involves the corpus callosum on MRI and clinical manifestations include dysarthria and gait disturbance and at most slight impairment of consciousness, associated with good prognosis. Our case is consistent with Type B, as the patient did not have impaired consciousness, MRI revealed partial lesions of the corpus callosum, and he recovered fully during the hospitalization. MBD is most commonly seen in malnourished alcoholics. Alcoholism is associated with several neurological conditions, such as Wernicke encephalopathy, Korsakoff syndrome, cerebellar degeneration, and peripheral neuropathy. MBD is possibly misdiagnosed as this population commonly presents with neurological findings. The specific pathogenesis of MBD remains unclear. MBD has also been found in diabetes, lupus, dermatomyositis, and anorexia nervosa. In some of these cases, especially in settings of diabetes or autoimmune disease, improvement with corticosteroids was seen. High dose thiamine has often been helpful in alcoholic patients with MBD, as with our case. Nevertheless, there is no proven treatment of MBD and degree of responsiveness has been variable. Cortical involvement generally predicts poorer prognosis, with multiple reports of persistent symptoms or vegetative state in spite of treatment with vitamins and corticosteroids. While there are many differentials of altered mental status and neurological findings in chronic alcoholics, it is worth recognizing the signs of MBD, especially since treatment with B complex vitamins and corticosteroids are associated with good response in Type B disease.

MASSIVE LEFT ATRIAL MYXOMA PRESENTING AS PULMONARY HYPERTENSION Darya Rudym^{2,1}; Meng Chen^{2,1}; Andrew Levy^{2,1}; Joshua Denson^{2,1}. ¹New York University School of Medicine, Bellevue Hospital Center, New York, NY; ²NYU Langone Medical Center, New York, NY. (Tracking ID #2199179)

LEARNING OBJECTIVE #1: Recognize a large myxoma as a possible cause of severe pulmonary hypertension and right heart failure

CASE: A 64 year-old woman with hyperthyroidism on methimazole presented with 6 months of worsening dyspnea on exertion. She reported gradually decreasing exercise tolerance from unlimited to less than one block over the course of 6 months. She also noted a 20 lb weight loss over the same time period. Associated symptoms included lower extremity swelling and an uncomfortable sensation in her chest when lying on her left side. Her exam revealed a very thin woman with clubbing of her fingers and toes, jugular venous distention of 14 cm, a parasternal heave, a loud P2, and a diastolic rumble heard best at the apex in the left lateral decubitus position. EKG showed evidence of L atrial enlargement and right heart strain. Transthoracic echocardiogram revealed a severely dilated left atrium with a 7.4 cm by 3.4 cm mass attached to interatrial septum that entered mitral valve orifice in diastole, leading to obstruction of mitral valve orifice and severely elevated transmitral gradient of 16 mm Hg. It also revealed severe pulmonary hypertension with a mean right atrial pressure of 15 mmHg and a pulmonary artery systolic pressure of 87.8 mmHg. Given the classic echocardiographic evidence of myxoma and absence of other systemic tumors, the patient underwent resection, which confirmed the diagnosis by histopathology. Her post-operative course was uneventful, and she was seen in clinic one month later reporting complete resolution of her symptoms.

DISCUSSION: Myxoma is a common primary cardiac tumor, which can affect all four of the chambers but the vast majority are seen in the left atrium¹. It is more commonly reported in women and can present at any age. The typical triad of myxoma presentation are symptoms of mitral valve obstruction, embolic symptoms and constitutional symptoms^{2–4}. Mitral valve obstruction leading to heart failure-like symptoms such as dyspnea on exertion and lower extremity edema are among the most common, reported in 67 % of presentations². Notably, patients do not report symptoms of heart failure until the tumor grows large enough to obstruct the mitral valve. Similarly, severe pulmonary hypertension develops when the myxomatous growth obstructs mitral valve outflow such that its hemodynamics mimic severe mitral valve disease. One of the studies reported pulmonary hypertension in 61 % of myxoma cases and the degree of mean pulmonary artery pressure was noted to increase proportionally with the size of the myxoma⁵. TTE is crucial in diagnosis and raises the suspicion for myxoma but histopathologic findings of scattered cells within mucopolysaccharide stroma seal the diagnosis. Prompt surgical resection is critical to prevent embolic events and post-operative course generally carries low risk of complications. Pulmonary artery pressure decreases immediately post excision and

patients report dramatic improvement in their symptoms^{4,5}. In our case, careful physical examination and early recognition of myxoma were instrumental in assuring a good outcome for the patient. Although an uncommon cause, the astute physician should consider left atrial myxoma in the differential for pulmonary hypertension. References: 1. Keeling IM. Cardiac myxomas: 24 years of experience in 49 patients. *Eur J Cardiothoracic Surg* 2002;22:971–977. 2. Pinede L. Clinical presentation of left atrial cardiac myxoma. A series of 112 consecutive cases. *Medicine (Baltimore)* 2001;80:159–172. 3. Goswami KC. Cardiac myxomas: clinical and echocardiographic profile. *Int J Cardiology* 1998;63:251–259. 4. Jelic J. Cardiac myxoma: diagnostic approach, surgical treatment and follow-up. A 20 years experience. *J Cardiovasc Surg (Torino)* 1996;37(6 Suppl 1):113–117. 5. Nakano T. The relationship between functional class, pulmonary artery pressure and size in left atrial myxoma. *Cardiovasc Surg* 1996;4:320–323.

MEDICARE 3-DAY RULE: A CASE IN POINT Lauren E. Corona²; Najibah K. Rehman¹; Diane L. Levine¹. ¹Wayne State University, Detroit, MI; ²Wayne State University School of Medicine, Detroit, MI. (Tracking ID #2192742)

LEARNING OBJECTIVE #1: Examine the Medicare 3-day rule and its history

LEARNING OBJECTIVE #2: Recognize the potential adverse consequences of the rule

CASE: Ms. W, a 78-year-old African-American female with dementia was brought to the hospital by her daughter because she was no longer able to manage her care. The daughter was interested in nursing home (NH) placement. Ms. W was oriented to person only. She was admitted to the medical service for medical clearance. This elderly patient, with no acute disease process, would require placement in a NH, however, Medicare would require her to spend 3.0 inpatient days in the hospital to justify/pay for discharge (d/c) to a NH.

DISCUSSION: The Medicare 3-day rule (M3DR) was instituted in 1965 with the primary aim of reducing use of limited, high-cost skilled nursing facilities (SNF) and ensuring appropriate and detailed work-ups for patients needing such care. In 1965, a 3-day inpatient stay was a reasonable time for work-up and development of care and d/c plans. The rule applies to both those coming from the community and the NH provided they will be returning to the NH upon d/c. The mean cost per hospital stay (in 2012) is \$8500. This increases to \$13,000 in the elderly. In comparison, the cost of a one-night stay at a SNF is \$430/day and \$300/day at a NH. It is widely known that with hospitalization comes an increased risk for adverse events (AE) (e.g., hospital-acquired infections, delirium, falls, medical errors). Older adults are particularly at increased risk for AEs. One proponent of the M3DR is the NH itself. The rule allows for NHs to transfer care to a hospital when a resident becomes acutely ill. Thus, the high costs associated with care for acute illness are eliminated. The NH benefits are twofold; the costs for the acute care for that patient are reduced, but also, upon return, the NH will receive higher Medicare payments because of the higher level of SNF care that is needed. Attempts to reassess and permit waivers to the rule have made little headway. Current efforts have focused on treating acute illnesses within these long-term care facilities without transfer to the hospital. Shared savings approaches where all parties are incentivized to keep patients out of the hospital are also being prioritized. Over the course of her hospitalization, Ms. W required no medical services that could not also have been performed in an outpatient or NH setting. On day 3 she began to wander and required a sitter. This increased her LOS as the NH stipulated she be sitter-free for 24 h prior to d/c. Because of the M3DR and subsequent need for a sitter, d/c fell on a Saturday (NHs do not take new patients on weekends). Ms. W was therefore d/c'd on day 6. The M3DR was instituted as a means of filtering admission to NHs and SNFs, and in doing so keeping Medicare costs down. Rather than keeping costs down, it requires unnecessary and lengthier hospitalizations. With the aging of the population and the increasing number of patients that will need these services, efforts should be made to maximize the care within less expensive settings instead of incentivizing admissions and increasing hospital LOS. Reevaluation of the M3DR must be undertaken for patient safety and quality of care to prevail.

MERCURY POISONING: A MIMICKER OF PHEOCHROMOCYTOMA Erin Meierhenry²; Alan Kuo²; Janki D. Amin²; Neveen S. El-Farra¹; Magdalena Ptaszny². ¹David Geffen School of Medicine at UCLA, Los Angeles, CA; ²UCLA, Los Angeles, CA. (Tracking ID #2179014)

LEARNING OBJECTIVE #1: Consider mercury poisoning in the differential diagnosis of hyper-adrenergic state.

LEARNING OBJECTIVE #2: Recognize the importance of obtaining a thorough history of herbal supplement use and alternative medications.

CASE: A 46-year-old man with recently-diagnosed hypertension presented with multiple complaints. He was well until 4 weeks prior to presentation when he noted gradual onset of diffuse weakness, paresthesias, tremor, fatigue and myalgias. He also suffered from new

insomnia, anxiety, subjective fevers and diaphoresis. He reported intermittent use of Chinese herbal medicine over years with increased consumption in the past several weeks. The patient had an extensive drinking history, consuming four alcoholic beverages per night for many years but quit at the onset of his symptoms. On presentation, vital signs were significant for persistently elevated blood pressure up to 218/100 and heart rate up to 100. His exam was significant for an obese habitus, profuse diaphoresis and salivation, and tremulousness. Neurologic exam was notable for poor articulation of speech, 4/5 strength in upper and lower extremities bilaterally, unsteady gait, fine tremor punctuated by course shaking in bilateral upper extremities, and tenderness to palpation of calves bilaterally. A broad differential was considered. CBC and chemistry were within normal limits. Urinalysis was notable for 3+ proteinuria. Neurologic work up including lumbar puncture, electromyography (EMG) of upper and lower extremities and brain and spinal cord imaging were unremarkable. A cortisol stimulation test was within normal limits. The patient was treated empirically for alcohol withdrawal with minimal improvement. The clinical presentation was concerning for pheochromocytoma, however, serum metanephrines and urine catecholamines were only mildly elevated. In addition, CT of abdomen and pelvis showed no evidence of adrenal mass. Toxicologic work up revealed an elevated blood mercury level, twice the upper limit of normal and a urine mercury level 25 times the upper limit of normal. He was started on chelation therapy with penicillamine and had gradual improvement in his symptoms and normalization of blood pressure. Though his hyperadrenergic symptoms improved, he continued to have sequelae from mercury toxicity, including neuropathy, proteinuria, autonomic dysfunction, generalized weakness, and urinary retention.

DISCUSSION: The most common causes of hyperadrenergic state include overdose of sympathomimetic drugs (ex: amphetamines, cocaine, epinephrine, monoamine oxidase (MAO) inhibitors with tyramine-containing foods), panic disorder, and pheochromocytoma. Mercury poisoning is a rare but important mimicker of pheochromocytoma, and should be considered in patients presenting with sympathetic overdrive in the right clinical context. By inactivating catechol-O-methyltransferases (COMT), mercury inhibits the breakdown of catecholamines, resulting in manifestations such as tremulousness, hypertension, and diaphoresis. Other common symptoms of mercury poisoning include weakness, fatigue, paresthesias, excess salivation, gait unsteadiness, and cognitive/emotional difficulties, all of which were present in our patient. Chinese herbal medications have often been associated with high levels of mercury and other heavy metals. Studies estimate that less than 50 % of patients disclose use of herbal medications or supplements. Disclosure of complementary and alternative medicine correlates with a perception of a high quality relationship with the physician. Disclosure may be improved by keeping social and cultural factors in mind and using certain keywords, such as natural products, teas, herbs picked from a garden, when obtaining the history. This case illustrates the importance of obtaining a thorough history of all medication and substance use, including complementary/alternative medications.

MESENTERIC VENOUS THROMBOSIS (MVT) Nathan Punwani¹; Jillian S. Catalanotti²; Richard Brooks¹. ¹George Washington University Hospital, Washington, DC; ²The George Washington University, Washington, DC. (Tracking ID #2201043)

LEARNING OBJECTIVE #1: Identify MVT as a rare cause of abdominal pain

LEARNING OBJECTIVE #2: Describe the thrombophilia and myeloproliferative workup necessary to assess for underlying causes of MVT

CASE: The patient is a 42 year old male with no significant past medical or surgical history who presented to the hospital for evaluation of a 4-day history of abdominal pain. His abdominal pain was concentrated in the epigastric region with no radiation or migration from one site of the abdomen to the other. The patient described the pain as waxing and waning over the course of 4 days, and he characterized it as a burning sensation that was worse after meals. The patient took over-the-counter antacids, which provided some transient relief of symptoms. He denied any nausea, emesis, jaundice, diarrhea, constipation, or GI bleeding. The patient did not regularly take any medications, including non-steroidal anti-inflammatory drugs, proton pump inhibitors, or H2 antagonists. He denied any history of gastroesophageal reflux or peptic ulcer disease. He also reported an unremarkable family history and denied any significant history of tobacco, alcohol, or illicit drug use. The patient initially presented to his primary care doctor on the day of admission and was reported to have a fever of 101.2 F (38.4C); he was then told to go to the emergency room for further evaluation. On admission, the patient was afebrile and all other vital signs were normal. Physical exam was noteworthy for mild tenderness to palpation in the right upper quadrant and epigastric regions with no rebound or guarding, and a negative Murphy's sign. Complete blood cell count, comprehensive metabolic panel, and lipase levels were all within normal limits. Lactate dehydrogenase was elevated at 800. In the emergency room, a CT of the abdomen with contrast was performed; the scan revealed an extensive thrombus within the superior mesenteric vein extending from the most distal branches to the proximal main portal vein. The patient underwent an extensive hypercoagulability and myeloproliferative workup that was

negative for prothrombin gene mutation, factor V Leiden, lupus anticoagulant, anticardiolipin antibodies, protein C and S studies, and JAK2 and BCR-abl genetic mutations. Flow cytometry for paroxysmal nocturnal hemoglobinuria was also negative. However, antithrombin III activity levels were found to be reduced at 40 %. The patient was started on enoxaparin 1 mg/kg SQ BID and was eventually transitioned to warfarin.

DISCUSSION: Mesenteric venous thrombosis (MVT) is a rare diagnosis that represents 1 in 5000 to 15,000 inpatient admissions and 6 to 9 % of cases of acute mesenteric ischemia. Thus, the diagnosis requires a high clinical index of suspicion. The symptomatic presentation of MVT tends to be acute in nature (60–80 % of cases) and usually manifests as evolving abdominal pain over the course of 6 to 14 days. The abdominal pain is often located in the mid-abdomen and occurs out of proportion to physical exam findings. The mean age at presentation is 40 to 60 years, and males are more commonly affected. Symptoms that are typically associated with MVT include nausea, emesis, anorexia, fever, constipation, diarrhea, and—if ischemia is prolonged—gastrointestinal bleeding. Diagnosis is made by abdominal CT imaging with contrast, which has an accuracy of 90 %. Treatment consists of anticoagulation with warfarin after appropriate enoxaparin or heparin bridging. Use of the novel factor Xa anticoagulants have not been evaluated by formal studies of MVT patients. Thrombophilia and malignancy—especially myeloproliferative disorders like polycythemia vera, essential thrombocythemia, and myelofibrosis—collectively account for 40 % of MVT cases. Consequently, a hypercoagulability and malignancy workup is crucial to identify the etiology of MVT. Abdominal imaging should reveal any local abdominal malignancies near the mesenteric veins that could trigger thrombosis. Hypercoagulability testing should consist of assays for prothrombin gene mutation, factor V Leiden, protein C and S, and antithrombin III levels. Ideally, blood should be drawn prior to initiation of anticoagulation for thrombophilia testing. JAK2 and BCR-abl genetic mutations should also be tested for identification of any occult myeloproliferative disease.

METASTATIC PANCREATIC NEUROENDOCRINE TUMOR CAUSING CUSHING-LIKE SYNDROME WITH REFRACTORY HYPERTENSION AND HYPERGLYCEMIA Bilal Shaikh¹; Andrew C. Rettew¹; Asad Jehangir²; Ana Abaroa-Salvatierra³; Kyle M. Bennett⁴. ¹Reading Health System, Wyomissing, PA; ²Reading Health System, West Reading, PA; ³Reading Hospital, West Reading, PA; ⁴The Reading Hospital, Wyomissing, PA. (Tracking ID #2198987)

LEARNING OBJECTIVE #1: Recognize ACTH hypersecretion in patient with symptoms such as new onset hypertension, hyperglycemia, proximal muscle weakness, psychosis, and leg swelling

LEARNING OBJECTIVE #2: Determine underlying cause of ectopic ACTH secretion in order to initiate proper treatment

CASE: A 57-year-old female with previous hypothyroidism evaluated for proteinuria of 2000 mg/dl on urinalysis, new-onset severe hypertension, worsening lower extremity edema, and fatigue. Physical examination revealed a blood pressure of 190/100 mmHg, mild right upper quadrant tenderness without rebound, and normal bowel sounds. Mild bilateral lower extremity pitting edema to the shins was also noted. Laboratory investigation revealed serum sodium of 140 meq/L (range: 135–153 meq/L) potassium of 1.7 meq/L (range: 3.5–5.3 meq/L), glucose of 195 mg/dL (range: 70–99 mg/dL), creatinine of 0.5 mg/dL (range: 0.5–1.5 mg/dL), and magnesium level of 1.7 mg/dL (range: 1.8–2.4 mg/dL). Urinalysis was significant for proteinuria of 30 mg/dL, no ketones, 250 mg/dL of glucose, and no red blood cells. Lower extremity duplex ultrasonography was negative for deep venous thrombosis. Chest computed tomography was negative for pulmonary embolism, but reported multiple iso-dense hepatic lesions. Right upper quadrant ultrasonography and abdominal and pelvic computed tomography confirmed multiple liver lesions without common bile duct dilatation consistent with malignancy, a 1.4 cm pancreatic tail mass, and mild bilateral adrenal hyperplasia. The patient underwent percutaneous liver biopsy and pathology identified a low-grade, well-differentiated neuroendocrine carcinoma. Endocrinology was consulted to evaluate for secondary causes of severe refractory hypertension with hyperglycemia. The patient was found to have a cortisol-producing paraneoplastic syndrome supported by a highly elevated 24 h free urine cortisol at 8911 mcg/24 h (range: 3.5–45 mcg/24 h), elevated morning cortisol of 140.2 mcg/dL (range: 8.7–22.4 mcg/dL), elevated adrenocorticotropic hormone (ACTH) 823 pg/mL (range: 10–60 pg/mL), and chromogranin A 2103 ng/mL (range: <93 ng/mL). The remainder of the secondary hypertension workup was negative including plasma renin activity (PRA), aldosterone, plasma catecholamines, growth hormone, and glucagon. The patient was seen in consultation by gastroenterology, hematology-oncology, and general surgery and started on ketoconazole to help with hyperglycemia and hypertension as well as subcutaneous octreotide. Her hyperglycemia was additionally treated with insulin aspart prior to meals with twice daily insulin glargine. The hypertension was controlled with intravenous hydralazine and lisinopril. She later developed psychosis, which was attributed to hypercortisolism. It was decided that the patient required a higher level of care and was transferred to a tertiary institution.

DISCUSSION: The incidence of ACTH-secreting pancreatic neuroendocrine tumors account for approximately 15 % of all ectopic Cushing syndrome cases and 1.2 % of all functioning pancreatic neuroendocrine carcinomas. Recognition of ACTH-secreting paraneoplastic syndrome is exceedingly difficult and usually requires repeated trips to multiple clinicians before a final diagnosis is made. Causes of ectopic Cushing syndrome include bronchial carcinoid, small cell lung carcinoma, medullary carcinoma of the thyroid, and functioning pancreatic neuroendocrine tumors. The diagnosis should be suspected in patients with sudden onset of hypertension with hyperglycemia, psychosis, proximal muscle weakness, and new onset lower extremity edema. Rapid clinical recognition and prompt initiation of treatment is crucial to good patient outcomes.

METHOTREXATE NEUROTOXICITY: PERSISTENT NEUROLOGICAL DEFICITS IN AN ADULT PATIENT WITH ACUTE LYMPHOBLASTIC LEUKEMIA (ALL) Avnish Dhamija; Michael Elnicki; Jennifer McComb. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2193211)

LEARNING OBJECTIVE #1: Recognize that intrathecal methotrexate therapy can lead to neurotoxicity with persistent neurological deficits.

CASE: The patient is a 55-year-old female with B Cell ALL and no prior neurological deficits who presented for HyperCVAD 3B treatment. Intrathecal methotrexate (MTX) was administered, which was shortly followed by acute kidney injury and toxic serum levels of MTX (defined as >10 mM/L 24 h after administration). MTX levels peaked at 31.35 mM/L (approximately 24 h after administration), and creatinine levels peaked at 3.4 mg/dL. Intravenous cytarabine was discontinued and rescue therapy was initiated with leucovorin and glucarpidase. Despite these measures, the patient developed new onset dysarthria, ataxia and altered mental status. A CT of the head demonstrated no evidence of ischemic or hemorrhagic stroke. An MRI of the brain revealed micro hemorrhages in the deep frontal white matter. An EEG showed moderate to severe slowing with focal areas of cerebral dysfunction superimposed on a diffuse disturbance of cerebral function or encephalopathy. A lumbar puncture was unrevealing. The patient received intravenous immunoglobulin for possible paraneoplastic syndrome, which did not improve her neurological status. Ultimately, she did not recover her neurological function. She underwent tracheostomy and percutaneous endoscopic gastrostomy and was transferred to a skilled nursing facility.

DISCUSSION: Due to the propensity of central nervous system involvement in ALL, MTX is commonly used as intrathecal chemoprophylaxis. MTX neurotoxicity is a grave and rare consequence of chemotherapy in ALL. The pathogenesis is unclear and the data is limited in terms of estimating the magnitude of risk for our patients. Prior studies have proposed various mechanisms of MTX induced neurotoxicity including altered levels of methionine, folate or homocysteine and elevated levels of adenosine. Adenosine is considered to be a central nervous system depressant, which may contribute to its neurotoxic effects. Aminophylline functions as an adenosine receptor antagonist and has been used in several cases to reverse MTX neurotoxicity, with partial and complete resolution of symptoms [1,2]. Currently, treatment of MTX induced neurotoxicity includes rescue therapy with leucovorin and glucarpidase. However, a limited number of cases have suggested that Aminophylline may play a role in treatment of MTX induced neurotoxicity. Further studies are necessary to elucidate the pathogenesis of MTX induced neurotoxicity in adults and treatment modalities. References: 1. Bernini, J. C., et al. "Aminophylline for methotrexate-induced neurotoxicity." *The Lancet* 345.8949 (1995): 544–547. 2. Ganesan, Prasanth, et al. "Methotrexate Induced Acute Encephalopathy: Occurrence on Re-challenge and Response to Aminophylline." *Indian Journal of Hematology and Blood Transfusion* (2013): 1

MIRTAZAPINE INDUCED GALACTORRHEA: A RARE ADVERSE EFFECT Hector M. Guzman; Gina Luciano. Baystate Medical Center/Tufts School of Medicine, East Windsor, CT. (Tracking ID #2199253)

LEARNING OBJECTIVE #1: Discuss the potential etiology of mirtazapine-induced galactorrhea as compared to antipsychotics.

LEARNING OBJECTIVE #2: Discuss a cost-conscious workup of hyperprolactinemia

CASE: Galactorrhea is a well-known adverse effect of medications that inhibit dopamine, such as antipsychotics and some antidepressants. Mirtazapine, a non-dopaminergic drug, is a common antidepressant and is not known to generally cause hyperprolactinemia or galactorrhea. We report galactorrhea as a rare side effect of mirtazapine. A 34-year-old female with a history of depression and anxiety presented to the clinic with bilateral breast engorgement and nipple discharge. She denied headaches, visual changes, temperature intolerance, change in libido or any new social stressors. She was not currently or recently breast-feeding and denied a history of nipple manipulation. Her menstrual cycles were monthly without recent changes. She had started mirtazapine therapy 8 weeks prior with

15 mg daily for 4 weeks and 30 mg daily for the subsequent 4 weeks with improvement of her mood. Physical exam revealed a weight gain of 5 kg over 6 weeks, bilateral breast enlargement and clear non-bloody discharge. There were no masses or skin lesions. Laboratory testing revealed an elevated prolactin level of 29.7 ng/mL. TSH of 0.8 mIU/mL, a pregnancy test was negative, serum creatinine was 0.8 mg/dL with a BUN of 8 mg/dL. Endocrinology was consulted for hyperprolactinemia. MRI of the head was not recommended because she had no menstrual abnormalities and no headaches or visual problems to suggest a prolactinoma. As her laboratory testing was also unrevealing for other potential causes of galactorrhea such as renal failure or hypothyroidism, no additional testing was deemed necessary. Although galactorrhea is an unlikely cause of mirtazapine, the time course suggested that this medication was the offending agent. Within two weeks of discontinuation of mirtazapine, the prolactin level decreased to 9.7 ng/mL and her galactorrhea resolved.

DISCUSSION: To our knowledge, this is the second case report in the United States and 3rd in the world in which mirtazapine is associated with galactorrhea. Hyperprolactinemia is often caused by antipsychotics and some antidepressants, but it is rarely caused by mirtazapine. Antipsychotics block dopamine receptors, eliminating the inhibitory effect on prolactin, thereby causing hyperprolactinemia and subsequently galactorrhea. Mirtazapine, in contrast, has no known direct effect on dopamine and is instead known to be a potent antagonist of 5HT₂, 5HT₃ serotonin receptors and alpha 2 receptors. It is unknown if mirtazapine acts on other serotonin receptors such as 5HT₁, which has been found to increase prolactin levels. Serotonin stimulation is thought to indirectly increase prolactin levels but the mechanism is unclear. Another plausible explanation for mirtazapine-induced prolactinemia is the stimulation of GABA neurons in the tuberoinfundibular dopamine cells. These cells have 5HT₁ receptors, which may affect the inhibitory effect of dopamine. Applying the scientific method and careful history taking are fundamental in approaching a common disease caused by an uncommon etiology. Evaluating galactorrhea in a patient requires a comprehensive history in order to avoid unnecessary testing. This can be addressed by exploring the common causes based on clinical signs and symptoms prior to ordering a battery of tests. Patients may present with symptoms of bilateral nipple discharge, menstrual cycle disturbances, low libido and breast tenderness. Bloody discharge is more suggestive of a breast tumor or malignancy and is typically unilateral. Conversely, breast discharge that is bilateral, clear and milky is suggestive of a systemic effect. If the fluid is confirmed to be milky, a prolactin level should be obtained. A normal level may indicate the presence variability in the peptide hormone heterogeneity and further work up may not be necessary. Hyperprolactinemia, however, warrants an assessment of common causes such as medications, stress, chronic breast stimulation, trauma, surgical procedures or anesthesia and illicit drug use such as marijuana. Obtaining this from the history may point towards a specific inciting event or medication. The first step in management should be to stop any offending medications. Secondary causes of hyperprolactinemia such as renal failure and hypothyroidism should be excluded before ordering an MRI to rule out a prolactinoma. An MRI, sophisticated hormone panels, referrals to a breast specialist, and breast ultrasounds without worrisome signs or symptoms and in the presence of other possible causes is not cost effective and can add undue psychological stress. In conclusion, mirtazapine is a commonly prescribed antidepressant, not typically known to cause galactorrhea, which may lead to preventable psychosocial distress and expensive medical costs if not identified early.

MISSED OPPORTUNITIES—A CASE FOR SUSPECTING RHINO-CEREBRAL MUCORMYCOSIS Ruchira Sengupta; Bronwyn L. Small; Niraj M. Patel; Brian Hachey; Jennifer Kaya; Hector Cajigas; Rana Awdish. Henry Ford Hospital, Detroit, MI. (Tracking ID #2196700)

LEARNING OBJECTIVE #1: Recognize the risk factors and clinical presentation in those patients at highest risk of developing invasive fungal infection.

CASE: Introduction: Mucormycosis is a rare human fungal infection that is most common in immune-compromised hosts. Because *Rhizopus* organisms thrive in high glucose, acidic environments, the serum from individuals in diabetic ketoacidosis (DKA), are an ideal milieu for fungi. Rhino-orbital-cerebral infection, in the setting of hyperglycemia with metabolic acidosis, is the most common clinical presentation of mucormycosis, and delayed diagnosis can be devastating. We present the case of a young, poorly controlled diabetic woman who failed outpatient therapy for facial cellulitis and was ultimately found, on surgical debridement, to have advanced orbital mucormycosis. **Case Presentation:** Patient is a 46 year-old woman with a history of poorly controlled insulin dependent diabetes, and recent dental extraction 2 days prior to admission, who presented to the emergency department with left eye swelling and pain. She was initially treated for blepharitis, however she returned shortly afterwards when her symptoms did not improve. She was subsequently prescribed oral klexef and erythromycin ointment for presumed cellulitis. Her symptoms progressed further to facial numbness, ocular pain, nausea and vomiting. CT scan of the face revealed maxillary and ethmoidal sinus disease, with left infraorbital cellulitis. Lab work at this time found her to be in DKA with anion gap 20, beta beta hydroxybutyrate of 4.07 mmol/L, and glucose >500 mg/dL, with the inciting event

presumed to be her orbital cellulitis. Vancomycin and ampicillin/sulbactam were initiated; however she continued to deteriorate with progression of her ophthalmologic exam to downward and lateral gaze restriction. There was suspected involvement of intraorbital neurovascular bundle given her facial hyperesthesia. She was urgently taken to the OR for a joint procedure by ENT and Ophthalmology for orbital wall decompression with left maxillary antrostomy, total ethmoidectomy and sphenoidectomy. Purulent material was removed from the maxillary sinus and culture demonstrated *rhizopus* species. Due to high index of suspicion, patient was empirically initiated on treatment with amphotericin B post-operatively, and subsequently anidulafungin was added for additional coverage.

DISCUSSION: Discussion: Rhino-orbital-cerebral infection is a devastating manifestation of mucormycosis in immunocompromised patients. The infection usually presents as acute sinusitis with requisite fever, nasal congestion, headache, and sinus pain. It spreads rapidly to all of the sinuses, palate, orbit, and brain. Our patient exhibited this pattern of typical spread, with orbital involvement, proptosis, and also facial hyperesthesia, which reflects infarction of the sensory branch of the fifth cranial nerve. Interestingly, our patient did not display a black nasal eschar, which is generally hallmark of infectious spread beyond the sinuses. The preceding dental manipulation may have been causative, reinforcing the importance of sterility during any invasive instrumentation. This case illustrates the importance of maintaining a high index of suspicion for fungal infection, especially in high-risk patients presenting with classic sinusitis symptoms. This is especially critical as prognosis is heavily dependent upon prompt identification, early initiation of antifungals and timely surgical intervention.

MODERN-DAY AWARENESS OF ZOONOTIC DISEASES AND CLINICAL IMPLICATION IN THEIR EARLY DIAGNOSIS Md U. Ali. Capital Health Regional Medical Center, Plainsboro, NJ. (Tracking ID #2198913)

LEARNING OBJECTIVE #1: *Staphylococcus intermedius* associated infections are very rare in human beings but should always be considered among the differential diagnosis in serious invasive infections, especially among patients who are in close contact with dogs

LEARNING OBJECTIVE #2: Canine associated zoonotic disease should always be considered under differential diagnosis especially in patients who are immunocompromised and having intimate contact with dogs

CASE: A 60 year old male with a history of diabetes, hypertension, pituitary mass, hypothyroidism and end stage renal disease on dialysis presented with complaints of fever, transient confusion and lethargy. The patient denied headache, neck pain, change in vision, nausea, vomiting, shortness of breath, recent fall, chest pain or palpitations. Patient has been on long term peritoneal dialysis and recently switched to hemodialysis for which he had tunneled dialysis catheter. There were reports of patient maintaining an intimate contact with his dog, where dog was licking him on several occasion. Patient had temperature of 102 ° F and tachycardia on arrival. Laboratory evaluation showed leukocytosis of 18.4 with 16 % bandemia. CT of head showed no change in pre-existing pituitary mass and chest X-ray was normal. Blood cultures returned positive for *S. intermedius* and therefore transesophageal echocardiogram was done which showed a mobile vegetation which was attached to the posterior mitral leaflet measuring approximately 18 mm. The patient was initially started on nafcillin resulting in a significant improvement in his condition. The patient was eventually discharged on cefazolin during which time he was asymptomatic and repeat blood cultures were negative for the microorganism

DISCUSSION: Zoonotic diseases are those that can be transferred between animals and humans. The CDC estimates that more than 6 out of every 10 infectious diseases in humans are spread from animals; fortunately the numbers are low in North America. The risk in humans becomes greater with immunosuppression. Skin and oral flora of dogs harbor various pathogenic microorganisms including *Staphylococcus intermedius*. Case reports of human infections from this microorganism are relatively rare, but the true incidence is unknown because the pathogen is frequently misidentified as *Staphylococcus aureus*. There are only 16 cases in the literature that have described *S. intermedius* as a cause of infection in humans ranging from soft tissue infections to bacterial endocarditis. Most of these cases have been described in association with exposure to animals, mostly dogs. Above we report a rare case of *S. intermedius* causing bacterial endocarditis in a dialysis patient. The presumed source of infection was the patient's dog. Although very rare in human beings, disease caused by *S. intermedius* should always be considered among the differential diagnosis of serious invasive infections, especially among patients who are in close contact with dogs.

MORE THAN JUST A CRAMP: A RARE CASE OF EXERCISE INDUCED ABDOMINAL PAIN Gregory Constantine; Lee Lu. Baylor College of Medicine, Houston, TX. (Tracking ID #2195053)

LEARNING OBJECTIVE #1: Recognize spontaneous intra-abdominal hematoma as a cause of acute abdominal pain.

LEARNING OBJECTIVE #2: Review spontaneous intra-abdominal hematoma.

CASE: An 18-year-old previously healthy Asian male presented with sudden onset of sharp non-radiating epigastric abdominal pain. Symptoms began after a routine exercise with weight lifting and jogging. The pain was associated with severe nausea without emesis. It was exacerbated in the supine position and improved when seated leaning forward. He denied diarrhea, constipation, dysuria, or trauma. Physical exam was remarkable for a mildly distended and diffusely tender abdomen, most pronounced over the epigastrium. CT scan of the abdomen and pelvis revealed a moderate amount of ascites as well as a large confluence of omental masses measuring up to $11.3 \times 7.5 \times 5$ cm and 45 Hounsfield units (HU). Laboratory values were significant for a drop in hemoglobin from baseline of 13 to 11 g/dL, the remaining studies including coagulation tests were within normal limits. A CT-guided biopsy of the omental mass revealed both fresh and degenerated blood consistent with a hematoma. He was diagnosed with spontaneous omental hematoma and intraperitoneal hemorrhage. Vital signs and hemoglobin remained stable throughout the remainder of the hospital course. His symptoms improved with supportive measures, and he was discharged with instructions to avoid strenuous physical activity until the hematoma resolved. Follow up CT one month later noted absence of the previously seen free peritoneal fluid. The left omentum contained a now smaller and resolving 4.5×3.4 cm non-enhancing lesion measuring 55 Hounsfield units (HU) consistent with an old hematoma.

DISCUSSION: Spontaneous hemoperitoneum is a rare cause of sudden abdominal pain from non-traumatic or iatrogenic events. The incidence and prevalence are not well known due to limited data in the literature. Visceral organs including the liver, spleen, kidneys, and adrenals are common sites of spontaneous intra-abdominal hemorrhage. Rupture of hepatic tumors, particularly hepatic adenomas are responsible for a majority of cases. Additional etiologies and risk factors include the presence of coagulopathy in the form of bleeding diathesis or anticoagulant medications. Reports of spontaneous intra-abdominal hemorrhage have been described involving the epiploic, splenic, and gastric vessels that supply the omentum. The majority of vascular etiologies such as aneurysms, arteriovenous malformations, pseudoaneurysms, mycotic aneurysms, or arterial dissection typically present as a catastrophic event. In this case, the underlying etiology is likely vascular rupture as a result of strenuous physical activity, leading to minor trauma in the setting of increased intra-abdominal pressure. There have been only a few case reports describing spontaneous intra-abdominal hemorrhage, both vascular and visceral occurring with little activity such as running/jogging. Rapid diagnosis is paramount with the initial therapeutic goals aimed at resuscitation. CT is the preferred method of diagnosis as it provides information regarding the area of extravasation. Once an active site of hemorrhage has been identified, further management via embolization or surgery may be pursued. Long term outcome data of exercise induced spontaneous intra-abdominal hemorrhage is not available. Hence, although rare, spontaneous hemoperitoneum should be considered in the differential diagnosis in a young patient presenting with acute abdominal pain after exercise.

MORE THAN JUST A SORE THROAT: A CASE OF PARAINFECTIOUS EPSTEIN-BARR VIRUS (EBV) CEREBELLITIS Irem Nasir. Greenwich Hospital, Greenwich, CT. (Tracking ID #2193986)

LEARNING OBJECTIVE #1: Recognize new ataxic dysarthria and gait as due to EBV cerebellitis.

CASE: A 39 year old healthy EMT worker with a remote history of drug abuse, had presented to his PCP 2 weeks prior to this admit, with sore throat, myalgias, and low grade fever 100.6 F. Pt was diagnosed with infectious mononucleosis with a positive monospot. He returned to our hospital with new progressive dysarthria and difficulty walking x4 days that he was unable to go to work. He was nauseous and vomiting x1 day. He denied headaches, neck stiffness, diplopia, dysphagia, vertigo, tinnitus, or any focal numbness or weakness. He also denied abdominal or chest pain, shortness of breath, dysuria, joint pains, and any rashes. He denied any current drug or alcohol use. He did have sick contacts as an EMT worker but did not recall anyone with similar symptoms. He denied any travel history in the past month. On exam, he was afebrile, with no pharyngeal erythema or exudates, and had mildly swollen anterior cervical nodes. On neurologic exam, he was alert, cranial nerves were intact, no nystagmus, neck was supple, and had no facial droop. He had full strength in all muscle groups, sensation intact, 2+ reflexes throughout, and plantar flexor responses. His exam was significant for severe finger-nose and heel-shin dysmetria, dysidiadochokinesia, guttural dysarthria and he had a wide based gait and needed assistance to even take a few steps. Labs were significant for WBC 7 with 55 % lymphocytes, mildly elevated liver function tests at AST 116, ALT 213, and total bilirubin 0.6. EBV serology was positive for Early Ag IgM and Viral capsid Ag IgM antibodies and serum EBV PCR at 3300, and negative for EBNA antibodies indicating acute EBV infection. Urine drug screen was negative. Vitamin B12 was normal. ASO, CMV, HIV, hepatitis, and Lyme serologies were all negative for acute infection. ANA, SPEP, and celiac serologies were negative. Ceruloplasmin was negative. CT head was negative. MRI brain

w/o contrast was negative. On the lumbar puncture, the WBC at 3, glucose at 68, and protein at 28, were all normal. Further extensive CSF workup followed. CSF was negative for herpes, HHV-6, CMV, enterovirus, varicella, JC virus, and importantly, also negative for EBV PCR. CSF West Nile, Lyme, VDRL serologies and cryptococcal Ag were negative as well. The CSF cytology and B and T cell rearrangements were negative. CSF oligoclonal banding was negative for any monoclonal bands. All blood and CSF cultures were negative. Both the serum and CSF paraneoplastic autoantibody panel were negative. On CT chest, abdomen, pelvis and US scrotum no overt masses were noted. Patient was diagnosed with acute EBV associated parainfectious cerebellitis and started on a combination of high dose IV methylprednisolone and IVIG x5 days. Patient only had mild improvement in his ataxic gait and dysarthria during his admission. He was discharged on no further medications and then followed up with physical and speech therapy. After about 8 weeks, patient was back to baseline and has returned to work as an EMT.

DISCUSSION: EBV, a human herpesvirus, results in a febrile syndrome with a sore throat, cervical adenopathy, and splenomegaly called infectious mononucleosis which is most common in children and young adults. EBV infection can also cause various neurologic disorders including bells palsy, meningitis, encephalitis, guillaine barre, cranial neuropathies, transverse myelitis, and acute cerebellar ataxia, as seen in our patient. Acute cerebellar ataxia is a rare manifestation of EBV and is more common in children. There can be a mild CSF lymphocytic pleocytosis, which was not the case with our patient. It is not clear if neurologic manifestations of EBV result from direct tissue invasion or from a postinfectious autoimmune phenomenon. The ataxia has even preceded the systemic symptoms of EBV by several days in some case reports. Most cases of EBV cerebellitis are benign, as in our patient, but there have been cases of life threatening cerebellar swelling, in which the MRI brain shows cerebellar enhancement, fourth ventricle obstruction with hydrocephalus, needing emergent decompression. High dose iv methylprednisolone and IVIG have been used anecdotally, but with unclear benefits. There are also case reports of some benefits with plasmapheresis suggesting that immunomodulatory therapy may limit the duration of this illness. Parainfectious EBV cerebellitis should be considered in the diagnosis of acute cerebellar ataxia, which will prevent much anxiety in both patient, families, and the clinicians, given the EBV cerebellitis benign course and excellent prognosis.

MORE THAN SKIN DEEP Andrew S. Calzadilla¹; Jessica Zuleta². ¹Jackson Memorial Hospital/ University of Miami Miller School of Medicine, Palmetto Bay, Macao; ²University of Miami, Miami, FL. (Tracking ID #2196101)

LEARNING OBJECTIVE #1: Recognize that scalp primary skin cancers may be aggressive if left untreated.

LEARNING OBJECTIVE #2: Remind physicians of the importance of evaluating the skin as part of a complete physical examination.

CASE: An 89 year Caucasian man living alone with past medical history of hypertension, coronary artery disease, diastolic heart failure and stage IV chronic kidney disease was referred to the hospital for evaluation of worsening renal function. The patient denied dyspnea, headache, fever, change in vision, and edema of the legs. Vital signs were normal. He was an alert man wearing a hat. Physical examination revealed a piece of gauze overlying a 6×5 cm fungating mass with a central defect of 1 cm depth and a foul smelling green discharge. The dura matter was visible on examination. Neurologic examination elicited no focal deficits. Meningeal signs were absent. The patient revealed the mass had been present for the preceding 2 years with progressive growth and also mentioned that he had concealed the lesion from his friends and family. Laboratory data revealed serum potassium 5.4, serum bicarbonate 16, blood urea nitrogen (BUN) 75 mg/dL, creatinine 3.65 mg/dL, NT-pro-brain natriuretic peptide (BNP) 3092 pg/mL. Wound cultures grew methicillin sensitive *Staphylococcus aureus* treated initially with renal-adjusted vancomycin then de-escalated to cefazolin. A renal ultrasound demonstrated no hydronephrosis. Magnetic resonance imaging (MRI) of brain with venogram suggested epidural extension of a soft tissue mass with mild mass effect on the superior sagittal sinus without evidence of dural venous sinus thrombosis. Full body PET scan showed increased FDG activity corresponding to the scalp mass with no lymph node uptake. After medical optimization for his multiple co-morbidities the patient underwent bi-frontal craniotomy with surgical excision of scalp mass and debridement from the dura with subsequent left anterior thigh free flap reconstruction. Pathology reported well-differentiated squamous cell carcinoma with perineural invasion, epidural extension and 1.5 cm disease free peripheral margins. The skin graft healed well and the patient was free of signs of infection or dehiscence two weeks after the surgery. He recovered well from the surgery and was later discharged to an inpatient rehabilitation center. Primary squamous cell carcinoma of the scalp is indolent but may attain aggressive features when it penetrates the periosteum. They are known to extend laterally for considerable distances with subsequent metastasis and possible death. Several case reports have indicated that the aggressive forms of squamous cell carcinoma are immune-histochemically similar to less aggressive scalp

squamous cell carcinomas. [i] Some aggressive cutaneous cancers can be characterized to be at increased risk of developing metastatic disease. The risk factors for metastases include recurrence, large tumors >2 cm, perineural involvement, poor differentiation, infiltration well into the dermis, renal or other solid organ transplant patients, immunosuppressed patients and tumors on the ear, lip or areas of the skin that get no sun exposure. [ii] [i] Unusually Aggressive Squamous Cell Carcinoma of the Scalp Victor Chung, MD1; Louis Insalaco, BS1; Talley Whang, MD2; Arnold Lee, MD1 1Department of Otolaryngology—Head and Neck Surgery, 2Department of Pathology Tufts Medical Center, Tufts University School of Medicine, Boston MA [ii] Bichakjian CK, Alam M, Andersen J, et al. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines): Basal Cell and Squamous Cell Skin Cancers, Version 1.2013, National Comprehensive Cancer Network, 2013.

DISCUSSION: Due to the extensive nature of disease at presentation, our patient required a multidisciplinary surgical intervention. Radiation is reserved for patients that are poor surgical candidates or tumors deemed inoperable. Clinical decision making is well informed by a thorough history and physical examination. However, patients with limited health literacy may fail to voluntarily reveal important parts of their history. Regardless of the original reason for medical evaluation, it is incumbent on all healthcare providers to obtain both a complete history and perform a thorough physical examination to aid in their evaluations of patients. Information should be elicited about sun exposure beginning in childhood and potential occupational exposure to ultraviolet light and radiation treatment. A total body examination of the skin is the only screening test available for cutaneous squamous-cell carcinoma.[i] [i] Cutaneous Squamous-Cell Carcinoma Murad Alam, M.D., and Désirée Ratner, M.D. *N Engl J Med* 2001; 344:975–983

MRI? WE DON'T NEED NO STINKING MRI Jason Dinsmoor; Michael P. Smith. University of Nebraska Medical Center, Omaha, NE. (Tracking ID #2200100)

LEARNING OBJECTIVE #1: Diagnose reversible posterior leukoencephalopathic syndrome (RPLS) with clinical factors when magnetic resonance imaging is not available

LEARNING OBJECTIVE #2: Develop a methodical approach to altered mental status

CASE: A 66 year-old man presented with altered mental status. He required intubation and management in the intensive care unit. Due to concern for a stroke, his systolic blood pressure had remained elevated, and due to the patient's implantable cardioverter defibrillator, brain magnetic resonance imaging was not obtained. The patient did undergo two computed tomography scans of his head two days apart that did not reveal findings consistent with a stroke. After stabilization of his clinical status including extubation he was transferred to the general medicine service with continued altered mental status and diplopia. He remained hypertensive, had episodes of confabulation, and continued diplopia with no other physical exam findings. Laboratory and imaging to that point had been unrevealing. His altered mental status and vision changes had slowly improved until on hospital day five when altered mental status, vision changes, and difficulty to control blood pressure returned. A repeat electroencephalogram was ordered at that time. Initially, there were no abnormalities noted, but the patient remained altered. Later during the course of the study, the patient developed status epilepticus by electroencephalogram. He returned to the intensive care unit for intensive blood pressure medication and antiepileptic medication. His condition improved to his baseline by hospital discharge with control of his blood pressure.

DISCUSSION: Altered mental status is a problem commonly encountered by the general Internist. A methodical approach to the problem is essential to making an accurate diagnosis, particularly when a patient's past medical history limits the diagnostic tests that are part of a standard evaluation. In these cases, a clinical diagnosis must be obtained by exclusion of all other reasonable alternatives. A simple starting point would be a thorough evaluation of all the organ systems required to allow a patient's brain to function properly, prioritized by known information and comorbidities, specifically evaluating the heart and lungs, the vessels supplying the brain, what is in the vessels (including the pressure), and the brain itself. Reversible posterior leukoencephalopathic syndrome is a cause of altered mental status that traditionally requires magnetic resonance imaging to diagnose. However, RPLS must be considered in patients who are persistently hypertensive, encephalopathic, and develop visual changes. Patients with RPLS can also frequently develop seizures as part of their clinical picture. As this is often a reversible condition, blood pressure control with titratable agents and prophylactic anti-epileptic medications are essential. When magnetic resonance imaging can be obtained, findings are often vasogenic edema most often localized to the posterior cerebral hemispheres, but not exclusive to this part of the brain. Altered mental status is a problem commonly faced by the general Internist and by its very nature, there are often significant hurdles in obtaining an accurate history. Thus a methodical approach to altered mental status is essential to making an accurate diagnosis, particularly when patient comorbidities limit diagnostic testing.

MUDDIED WATERS—ULCERATIVE COLITIS VS SHIGELLOSIS: DIAGNOSTIC ERRORS IN A PATIENT WITH BLOODY DIARRHEA Jeffrey M. Luk¹; Yi-han Yang¹; Stephen Holt². ¹YNHH, New Haven, CT; ²Yale University, New Haven, CT. (Tracking ID #2198916)

LEARNING OBJECTIVE #1: Recognize common cognitive biases and their contribution to misdiagnosis

LEARNING OBJECTIVE #2: Identify exposures, symptoms, signs and laboratory findings that suggest a diagnosis of shigellosis or inflammatory bowel disease

CASE: A 29-year-old African American male presented with lower abdominal cramping followed by onset of dark brown stool up to 10–15 times a day associated with urgency, tenesmus, nausea, non-bloody, non-bilious emesis, and a reported fever of 101 for 3 days. On day of presentation he developed hematochezia with liquid stools. He denied recent travel, sick contacts, or eating raw food, but endorsed increased stress. Past history is notable for lactose intolerance since adolescence and four years of intermittent, self-resolving abdominal cramps and non-bloody, mucous diarrhea lasting several days, occasionally associated with alcohol, greasy foods or stress. He takes no medications. Family history is significant for a brother with biopsy-proven ulcerative colitis (UC). He works at a breakfast diner, drinks alcohol infrequently, and has a three-pack-year smoking history with recent cessation. He is sexually active with one male partner. Review of systems was negative for significant weight loss, blurry vision, oral ulcers, arthralgia, skin rashes, peri-anal disease, or dysuria in the last four years. On exam, he was afebrile with blood pressure 155/84, heart rate 73. He appeared uncomfortable. There were no oral ulcers. Heart and lung exam were normal. His abdomen was diffusely tender to palpation particularly in the lower quadrants with hyperactive bowel sounds. He had no organomegaly, joint swelling, rashes, or obvious perianal or rectal abnormalities. Laboratory testing revealed a leukocytosis of 12.6 with 87 % neutrophils, normal electrolytes, hemoglobin, LFTs and lipase; CT abdomen demonstrated diffuse thickening of the distal descending colon to the rectum. Work-up upon admission was significant for normalized WBC but positive fecal leukocytes and elevated CRP of 169. He was *C diff* antigen, O&P, HIV and gonorrhea/chlamydia negative. Given his age, family history and recurrent episodes of diarrhea with fecal leukocytes and elevated CRP, inflammatory bowel disease (IBD) was thought to be the most likely cause. He was treated supportively with intravenous hydration, pain medications and anti-emetics. GI performed a colonoscopy that was interpreted as pancolitis thought to be most consistent with UC. With preliminary stool studies yielding normal bowel flora, the patient was started on prednisone 40 mg and mesalamine 2.4 mg daily and he was ultimately sent home with a 10-week steroid taper. However, one day post-discharge, his stool culture yielded *Shigella flexneri*. The patient was informed to stop taking prednisone and to instead start Ciprofloxacin for 7 days. Four days post-discharge, surgical pathology of colonic biopsies were interpreted as most consistent with acute, self-limited colitis.

DISCUSSION: Studies show that diagnostic error is the most common reason for malpractice claims. Flaws in systems design, provider training, and clinical reasoning may all contribute to misdiagnosis. The diagnostic process involves gathering and interpreting information for generating a differential and refining and verifying the diagnosis. The medical literature describes a wide number of cognitive biases that clinicians may experience during this process. Examples of biases include: availability, anchoring, confirmation, framing, premature closure, diagnosis momentum, aggregate, and gambler's fallacy. Acute bacterial colitis and inflammatory bowel disease can present with similar signs and symptoms. The patient's history may help guide diagnosis, but results of stool cultures or endoscopic imaging and biopsies may ultimately be required to confirm the diagnosis. Several biases may have been at play that led to the initial diagnosis of UC in this patient and to his exposure to immunosuppressant drugs. The principle of Occam's Razor suggests that a patient's presenting symptoms are more likely to be caused by one etiology rather than two unrelated problems. Thus, our patient's four year history of intermittent mucous diarrhea and his new, acute bloody diarrhea were often attributed to a single etiology. Framing, confirmation and anchoring biases may have caused providers to place less emphasis on causes of acute inflammatory diarrhea despite the fact that this was the first time the patient experienced bloody diarrhea. The diagnostic momentum of UC as the most likely etiology of this patient's bloody diarrhea was also carried from the primary team to the GI consultants and individual interpreting the colonoscopy. Finally, accepting the diagnosis of UC after colonoscopy but prior to verification with biopsy results and negative stool cultures is an example of premature closure. Awareness of cognitive biases may help providers avoid pitfalls during the diagnostic process.

MUDPILES MADE CRYSTAL CLEAR Aimee E. Hiltbold²; Ahmed Mohiuddin¹. ¹Tulane University, New Orleans, LA; ²Tulane University Medical Center, New Orleans, LA. (Tracking ID #2199229)

LEARNING OBJECTIVE #1: 1. Recognize the presentation of ethylene glycol intoxication.

LEARNING OBJECTIVE #2: 2. Appreciate the pathophysiology and treatment of ethylene glycol toxicology.

CASE: A 20-year-old male college student presents after being found unresponsive. After finishing final exams, he reported considerable weakness, and was unarousable the next morning. His past medical history is significant for premature birth at 23-1/2 weeks and panhypopituitary syndrome. He is intermittently compliant with his thyroid, steroid, and growth hormone regimen. The family denies any history of suicidal ideation or ingestion, and states that the patient does not drink alcohol, smoke tobacco, or endorse any recreational drugs. Initial vital signs are T: 37, P: 55, RR: 17, BP: 120/90, saturating 100 % on RA. His CGS is 8. Pupils are sluggish but reactive. There are no signs of injection sites. His laboratory results are significant for Na: 140, K: 4.7, Cl: 107, Bicarb: 13, for an AG: 20, BUN: 13, Cr: 1.2, and Gluc: 93. Acetaminophen, salicylate, BAL, and UDS are unremarkable. EKG shows sinus bradycardia. Stat CT of the head shows no acute intracranial process. All other labs and imaging are unremarkable. Overnight, he becomes tachycardic and develops a severe metabolic acidosis with a pH of 6.87. Measured serum osmolality is 344, with an osmolal gap of 51. Urinalysis is negative for ketones, has microscopic hematuria and occasional calcium oxalate crystals. Following hemodialysis and correction of his acidosis, he confesses to ingestion of antifreeze in a suicide attempt.

DISCUSSION: Ethylene glycol is a lethal and accessible poison encountered by hospitalists, which can be effectively treated with early recognition. Alcohol dehydrogenase and aldehyde dehydrogenase convert ethylene glycol into glycolic acid and oxalic acid. Oxalic acid binds calcium, leading to calcium oxalate crystals that deposit into kidney, brain, lung, and heart. Initially, serum osmolality may be increased, but acidosis is generally absent. Within hours of ingestion, metabolism to toxic organic acids leads to a high anion gap metabolic acidosis, causing neurological and cardiopulmonary decompensation. Urinalysis will reveal oxalate crystalluria in 50 % of cases, and will usually demonstrate acute renal failure. Treatment of ethylene glycol ingestion depends on the stage of presentation. Within 30–60 min of consumption, nasogastric tube suctioning can be performed. Those patients with significant toxicity, as evidenced by AMS, metabolic acidosis, and increased osmolal gap, should undergo immediate hemodialysis to remove the parent compound and toxic metabolites. Folic acid, thiamine, and pyridoxine may assist in toxic metabolite breakdown. Ethanol has 10 to 20 times greater affinity for alcohol dehydrogenase, and out-competes ethylene glycol as a substrate. This inhibits conversion into toxic metabolic acids. Fomepizole, with 500 to 1000 times greater affinity for ADH, is able to completely inhibit ADH at lower concentrations, is easier to use, and is FDA approved. If acidosis is absent at presentation, Fomepizole may be effective as a sole agent for treatment. Guidance per the toxicology service and regional poison control centers are helpful in developing an appropriate treatment plan.

MUSCLE PAINS FROM A PILL Matthew L. Law, Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198613)

LEARNING OBJECTIVE #1: Recognize the proposed mechanisms of statin-induced myopathy

LEARNING OBJECTIVE #2: Discuss lipid management after statin-induced myopathy

CASE: A 44 year-old man presented with 2 days of diffuse myalgias. The pain started with 10/10 diffuse aching pains in his bilateral lower extremities. That same night he had performed his normal nightly exercises. He called his primary care physician, who encouraged vigorous fluid intake. He drank 2 l of Gatorade with no relief from his symptoms. He was previously diagnosed with hypertension and hyperlipidemia; he had recently changed from pravastatin to atorvastatin due to elevated liver enzymes. Physical exam demonstrated diffuse muscle tenderness but no point tenderness. He exhibited 5/5 strength in bilateral lower extremities. Initial creatinine was 1, with AST of 88 and ALT of 45 (a decrease from previous) and a CK of 2721. After aggressive IV fluid resuscitation, the CK trended to 2386. Due to patient's recent change in statins and slow response of CK to fluids, he was diagnosed with statin-induced myopathy. He was discharged on a 6-week statin holiday and then subsequently started on low-dose rosuvastatin by his primary care physician.

DISCUSSION: Myalgias are a common symptom presented to a general internist. A differential diagnosis for myalgias includes alcohol induced myopathy, connective tissue diseases, electrolyte and endocrine abnormalities, and peripheral neuropathy. It is necessary to acquire an accurate list of medications along with any recent changes and reason for change when taking a patient's history. Due to the increasing risk of polypharmacy, medication side effects should always be considered. The 3-hydroxy-3-methylglutaryl coenzyme A-reductase inhibitors, commonly known as statins, are one of the most common drugs prescribed to help lower cholesterol, and decrease cardiovascular morbidity and mortality by about 25 %. With the recent changes in guidelines, statin therapy is expected to increase as the threshold for statin therapy encompasses a greater patient

population and use of other lipid lowering agents is less supported. Studies have shown that in clinical practice up to 5–10 % of patients receiving statins develop myopathy. This side effect has been underestimated in randomized controlled trials due to exclusion of high-risk patients such as patients with a history of muscle symptoms and omission of mild symptoms in patient interviews. Additionally, most trials focus on the incidence of rhabdomyolysis rather than myalgia, fatigue, or minor muscle complaints. Many causes have been proposed for statin-induced myopathy including metabolic reduction of cholesterol and coenzyme Q10 levels, drugs that interfere with CYP-450 metabolism, and the individual statin characteristics of either being hydrophilic or lipophilic. Hydrophilic statins (pravastatin and rosuvastatin) have theoretically decreased uptake in skeletal muscle and therefore should have less muscular symptoms-though muscle symptoms are still reported in these individuals. Once, statin-myopathy is diagnosed, it is important to initially reassess the lipid goal. If cholesterol therapy is still needed, a 6-week statin holiday should be prescribed to see if symptoms resolve. A physician should then consider a trial of pravastatin or rosuvastatin at lower doses. Statin-induced myopathy is a more common side effect of statin therapy than is often realized. This side effect needs to be considered and reviewed with each individual patient a general internist places on lipid lowering therapy. Special consideration should be given to polypharmacy issues and if a previous history of muscle disease exists. Furthermore, this side effect should be considered and discussed as a possible reason for non-adherence in patients.

MUSCLE TROUBLE: MCARDLE DISEASE DISCLOSED BY STATIN THERAPY Gail M. Pokorney, University of Washington, Soldotna, AK. (Tracking ID #2194157)

LEARNING OBJECTIVE #1: Recognize that statin administration can unmask metabolic myopathy

LEARNING OBJECTIVE #2: Distinguish between statin myopathy and underlying muscle disease

CASE: A 61-year-old woman presented with several weeks of bilateral lower extremity pain and weakness. Her medical history was notable for a transient ischemic attack, which prompted initiation of simvastatin four years earlier. She had no family history of neuromuscular disease. Physical exam demonstrated intact upper extremity strength but reduced strength (4/5) in the proximal lower extremity muscle groups bilaterally. She was noted to rise slowly from a chair without use of her arms. Neurologic exam was otherwise unremarkable. Laboratory work-up was normal except for a creatine kinase (CK) level of 1116 U per liter (normal range 23–143 U per liter). Her muscle weakness and CK elevation were attributed to statin myopathy, and simvastatin was discontinued. Over the next 3 months, the CK level decreased but never normalized. The lower extremity muscle pain and weakness persisted as well. Muscle biopsy was performed and demonstrated absent myophosphorylase activity. Additional history revealed subjective muscle weakness and reduced exercise tolerance dating back to childhood. Surprisingly, there were no clinical episodes of rhabdomyolysis, despite participation in at least one 10-km road race. Muscle symptoms worsened after initiation of simvastatin, but the patient attributed this to aging and deferred seeking medical attention until symptoms became severe. Based on her lifelong muscle weakness, difficulty tolerating exercise, and absent myophosphorylase staining on biopsy, a diagnosis of McArdle disease (myophosphorylase deficiency) was made. The patient and her son received counseling on the management and genetic implications of this diagnosis.

DISCUSSION: Statins are near-ubiquitous medications with myopathic side effects ranging from myalgia to rhabdomyolysis. The reported frequency of statin-associated muscle events is 1–5 % in clinical trials and 11–29 % in observational cohorts; the difference is attributed in part to patient selection in the trials. The onset of muscle symptoms typically occurs within weeks to months of statin initiation but can occur at any point in the treatment course. CK elevation, if present, can range from >3-fold to >50-fold greater than untreated baseline values. Time to recovery from statin myopathy following statin withdrawal likewise can be variable with respect to both symptom resolution and normalization of CK. Numerous conditions can increase the risk for statin-induced muscle toxicity, including age, gender, co-morbid medical conditions, drug-drug interactions, and genetic variants. In patients with previously undiagnosed metabolic myopathy, statins may precipitate or worsen neuromuscular symptoms, as described in the case above. There are several case reports of statin therapy unmasking not only McArdle disease but also CPT II deficiency, myoadenylate deaminase deficiency, and mitochondrial diseases. One cross-sectional study of patients with drug-induced myopathies found a higher prevalence of hereditary metabolic muscle disorders (both homozygote and carrier states) than would be expected in the general population. Another retrospective study of patients who developed chronic muscle diseases after age 50 observed a greater than expected frequency of prior exposure to statins. The precise mechanism by which statins trigger clinical expression of pre-existing myopathy is unknown, but it is postulated that statin effects on energy metabolism couple with genetic susceptibility to produce muscle symptoms in these high-risk patients. In practice, it can be

difficult to distinguish between pure medication-related myotoxicity and latent or subtle muscle disease that becomes clinically manifest after statin administration. Regardless of etiology, it is appropriate to stop a statin in the setting of intolerable symptoms and/or significant CK elevations (>10 times the upper limit of normal). Current literature suggests that patients with muscle symptoms (particularly weakness) and elevated CK levels (>3 times the upper limit of normal) that persist 1–3 months after statin discontinuation should receive diagnostic evaluation for underlying muscle disease. Electromyography can be a useful screening test to determine if muscle biopsy is needed, especially in patients with asymptomatic CK elevations. CK measurement prior to onset of statin therapy, while not necessary in all patients, is recommended in those with baseline muscle complaints. This may lead to earlier identification of underlying primary muscle disease and help mitigate diagnostic uncertainty when a new statin user develops muscle symptoms.

MY-OH-MA... IT TOOK MY BREATH AWAY Jonathan D. Kirsch; Kay L. Ingraham. University of Minnesota, Minneapolis, MN. (Tracking ID #2194007)

LEARNING OBJECTIVE #1: Recognize an abdominal mass as a potential cause of venous stasis, deep vein thrombosis, and pulmonary embolism.

LEARNING OBJECTIVE #2: Review the acquired risk factors and inherited thrombophilias leading to venous thromboembolism.

CASE: A 49 year-old, previously healthy woman presented with one day of progressively worsening right-sided body pain and shortness of breath. She noted her pain started while in bed the previous morning, radiating from her right upper quadrant to her chest and worsening with inspiration. She denied fever or leg swelling and denied any recent surgeries, hospitalizations, or traveling. She had no personal or family history of heart disease or blood clots and did not smoke tobacco or take oral contraceptives. The patient had been told she had a fibroid uterus several months ago and reported experiencing heavy menstrual periods for years. On exam, she was tachycardic and tachypneic, taking shallow breaths. Her abdomen was non-tender to palpation although pain was present in her right upper quadrant with inspiration. She had no lower extremity edema. Due to high suspicion for venous thromboembolic disease and widespread pain, a CT scan of her chest, abdomen and pelvis was ordered. It revealed bilateral pulmonary emboli and a right sided pleural effusion. The abdominal and pelvic CT scan revealed a 20.1×19.4×12.7 cm uterine myoma compressing the inferior vena cava and common iliac veins. A lower extremity venous Doppler ultrasound was negative for deep vein thrombosis. A complete hypercoagulability workup was also negative. The patient was diagnosed with venous thromboembolism due to mass effect from her large uterine myomas. She was treated with enoxaparin and scheduled for a total hysterectomy.

DISCUSSION: Venous thromboembolism is a common problem encountered by internists. They are a result of a culmination of Virchow's triad—venous stasis, vascular endothelial injury, and a hypercoagulable state. When exploring the potential causes of a venous thromboembolism, it is important to take a thorough history before reporting an unprovoked venous thromboembolism. The label of “unprovoked” can lead to longer anticoagulation and further unnecessary, diagnostic workup. As uterine myomas are very common in women over the age of 40, it is important to recognize an enlarged uterus as a potential cause for venous thromboembolism. Definitive treatment for a venous thromboembolism in this case is a total hysterectomy. Venous thromboembolisms are usually classified as being caused by acquired risk factors, inherited thrombophilias or a combination of these. Acquired risk factors for VTE include the following: immobility, hospitalization, surgery, oral contraceptive use, antiphospholipid antibody syndrome, and malignancy. Inherited thrombophilias include Factor V Leiden, Prothrombin, Protein C and S gene mutations as well as Antithrombin deficiency.

MYOCARDIAL INFARCTION: THE FORME FRUSTE OF INFECTIVE ENDOCARDITIS Daniel J. Coffin. Baystate Medical Center, Agawam, MA. (Tracking ID #2196080)

LEARNING OBJECTIVE #1: Recognize ST elevation myocardial infarction as a presentation of infective endocarditis in patients with conventional risk factors for coronary artery disease and bacteremia.

LEARNING OBJECTIVE #2: Recognize risk factors for embolization, and when to consider surgical intervention in addition to medical management.

CASE: MA is a 72 year-old woman with a medical history of acute myelogenous leukemia, hypothyroidism, hypertension, and non-insulin dependent diabetes mellitus who presented with a weeklong history of fatigue and non-specific malaise, with a 1-day history of acute substernal chest pain. Social history significant for 30 pack-year tobacco history, but no alcohol or intravenous drug abuse. Initial workup revealed an obese elderly woman with no fever, and compensated vital signs. Her cardiopulmonary exam did not reveal any new murmurs, and she was euolemic. An initial white blood cell count was noted to be 19.5/k/mm3 without bands, neutrophil predominant. An ECG revealed anterolateral ST elevations

indicative of a STEMI, and she underwent percutaneous transluminal coronary angiography (PTCA) and was found to have a proximal LAD occlusion that was remedied with thrombectomy and a single drug eluting stent, with resolution of chest pain. On her post-myocardial infarction transthoracic echocardiogram, a vegetation was seen surrounding her mitral valve without evidence of valvular insufficiency. This finding was confirmed with a trans-esophageal echocardiogram, which revealed a friable lesion measuring 2.39 cm×1.92 cm×1.8 cm. Blood cultures drawn at that time grew *Viridans streptococci*. As the myocardial infarction was deemed to be a septic embolization event, and with concern of further embolization, the patient underwent mitral valve replacement, with the causative vegetation being confirmed as infective. On further evaluation, the patient claimed to have her chemotherapy port removed for completed chemotherapy one week prior to presentation—inferred to be the initial causative nidus of bacteremia.

DISCUSSION: Native valve endocarditis has known complications associated with embolic phenomenon. One of these, septic coronary embolism, can cause coronary artery occlusion and ST segment myocardial infarction. Although a complication of known bacterial endocarditis, per the best of our knowledge, it is exceedingly rare for the presenting symptom of endocarditis to come in the form of acute ST elevation myocardial infarction. Recognizing risk factors for bacteremia in patients presenting with myocardial infarction would increase suspicion in the clinician to look for endocarditis, and signs of other potential complications such as cerebral vascular accidents, or splenic infarction. Septic coronary embolism is a small fraction of embolic events resulting from vegetations of infective endocarditis, and is often fatal. According to guidelines from the American College of Cardiology and American Heart Association, surgical intervention is indicated with vegetations >10 mm or recurrent emboli despite antibiotic therapy (a grade IIb and IIa recommendation, respectively), as these present the greatest risk for embolization. Medical management of septic coronary embolization includes thrombectomy, percutaneous transluminal coronary angioplasty, or surgical embolectomy. None of these interventions have been studied adequately enough for clear recommendations regarding preferential modality, so selection of intervention is base on clinical scenario and available clinical resources.

NEAR FATAL CASE OF LEGIONNAIRE'S DISEASE WITH RHABDOMYOLYSIS Tatiana McKenna²; Ronnie Mantilla¹. ¹Capital Health Regional Medical Center, Trenton, NJ; ²Capital Health Regional Medical Center, Hopewell, NJ. (Tracking ID #2154102)

LEARNING OBJECTIVE #1: Rhabdomyolysis with acute renal failure (ARF) is a rarely recognized entity and associated with high morbidity and mortality rates. We strongly suggest to monitor CK levels immediately after *Legionella* infection is suspected to prevent renal damage.

LEARNING OBJECTIVE #2: Recognition of this interrelationship (mentioned in #1) can help make an early diagnosis, start timely treatment (including fluids and renal replacement therapy), and prevent fatal consequences.

CASE: A 37-year-old African American male smoker with a medical history of hypertension and asthma presented with 1-week of malaise, night sweats, dry cough and decreased urinary output. There was no diarrhea. Patient worked as a heavy duty cleaner at a local school. Physical exam showed temperature of 97.6 F, blood pressure 110/60 mm Hg, heart rate 98/min, respiratory rate 18/min, dry crackles at the left lung base. Significant laboratory findings on admission were: white blood cell count 17,900/μL, 42 % band, Sodium 133 mEq/L, Potassium 2.7 mEq/L, and Bicarbonate 29 mEq/L, blood urea nitrogen 18 mg/dL, and creatinine 1.57 mg/dL. Creatinine phosphokinase level (CK) 11,583 U/L. Arterial blood gas showed pH 7.22 Units, pCO2 65 mmHg, pO2 25 mm Hg on 100 % FiO2 via non-rebreather mask. Chest XRay revealed entire left lung consolidation. All sets of blood and urine cultures were negative, urine was positive for *Legionella* antigen. Patient was started on parenteral antibiotics. His hospital stay was complicated by development of respiratory failure and several episodes of cardiac arrest requiring multiple resuscitative attempts. He was transferred to the intensive care unit (ICU) on mechanical ventilator, new antibiotics were added. CK levels increased up to 58,586 U/L, and he subsequently developed ARF requiring hemodialysis (HD). In 2 weeks he was extubated, renal function improved and HD was discontinued.

DISCUSSION: *Legionella* infection is among the first four major causes of community acquired pneumonia. Risk factors include male gender, older age, smoking, alcoholism, chronic obstructive lung disease, recent travel, and chronic underlying disease (with or without immunodeficiency). It is worth mentioning that diarrhea is reported in 21–50 % and encephalopathy in 4–53 % of cases. Both are suggestive but not pathognomonic for the *Legionnaire's disease* (LD). Rarer findings in LD are rhabdomyolysis and acute renal failure (ARF). These complications when present can be associated with prolonged hospital stay and increased risk of severe disease progression. We present a case of severe rhabdomyolysis and ARF in the absence of obvious signs of *Legionella* infection. Rhabdomyolysis and ARF in patients with LD are associated cofactors that can predict development of severe complications. Possible mechanism is a direct bacterial invasion or endotoxins which can damage the muscle. Subsequent CK elevation leads to acute interstitial nephritis.

NEUROCYSTICERCOSIS: LIVE WORM NO PROBLEM, DEAD WORM BIG PROBLEM John S. Fleming; Aaron Roberts; Christopher Di Felice. Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI. (Tracking ID #2196537)

LEARNING OBJECTIVE #1: Recognize the clinical features of neurocysticercosis

LEARNING OBJECTIVE #2: Assess the need for treatment in patients with neurocysticercosis

CASE: A 42 year-old male presented after having a generalized tonic-clonic seizure at home. He works as an engineer and is required to travel overseas frequently. He confirmed traveling to China and India multiple times over the past two decades including a weeklong trip to China 2 months prior to admission. Initial labs including CBC, CMP, CPK, and troponin were within normal limits. CT brain demonstrated right parietal calcification and MRI brain showed right parietal cortical calcification with surrounding edema consistent with late stage neurocysticercosis. Patient was admitted and started on IV Dilantin and Decadron. His symptoms improved and he remained seizure-free throughout the rest of his hospitalization. He was discharged home in stable condition on PO Decadron and PO Dilantin for seizure prophylaxis and was referred for follow up with neurology.

DISCUSSION: Cysticercosis is caused by the larval stage of the pork tapeworm *Taenia solium*. It is endemic in most developing countries and while the exact prevalence is unknown, it is estimated that 50 million people living in India, Asia, Africa, and Latin America have the parasite. Transmission is via ingestion of *Taenia solium* eggs which are shed in the stool of humans or pigs harboring the intestinal tapeworm. While the scolex is alive it produces a number of substances that surround it and prevent normal host immunologic reaction. However, once the scolex is dead it no longer produces this protective coating and host immunologic response ensues resulting in inflammation. It is this inflammation, edema and calcification that result in adult onset seizures that characterize many cases of neurocysticercosis. Neurocysticercosis can be asymptomatic for many years after infection during the time that the scolex is alive. The typical asymptomatic period lasts between 10 and 20 years after initial infection until death of the scolex and subsequent symptoms. Clinical manifestations depend on the location of the cysts, but are generally associated with seizures and headaches. Our patient was most likely infected while in India and thus it is likely that the *Taenia solium* scolex was present in his brain for many years before dying and causing symptoms. When a single lesion that contains a nonliving parasite is found then no anti-parasitic medications are indicated as was the case with our patient. However, if multiple lesions in different stages are found then initiation of Albendazole or Praziquantel is appropriate. Concomitant treatment with steroids to prevent or reduce inflammation from the death of a scolex will help reduce the risk of seizure, mass effect, and other symptoms.

NEW ON THE DIFFERENTIAL FOR KIDNEY FAILURE: CANNABINOID HYPEREMESIS SYNDROME Julie Caplow; David J. Aizenberg. University of Pennsylvania, Philadelphia, PA. (Tracking ID #2197404)

LEARNING OBJECTIVE #1: Recognize cannabinoid hyperemesis syndrome and renal failure as potential complications of longstanding marijuana use.

LEARNING OBJECTIVE #2: Obtain a thorough social history in patients presenting with acute kidney injury.

CASE: A 49 year old previously healthy man presented to the emergency room with a 2 day history of incessant vomiting associated with muscle cramps and oliguria. He had started after doing roof work on a hot summer day. He denied taking any medications but endorsed longstanding daily marijuana use, which he continued during his illness with transient relief in symptoms. On presentation he appeared dry and was found to have a creatinine of 7.6 mg/dL. Retroperitoneal ultrasound was unremarkable and urine sediment showed granular casts. He was treated with intravenous fluids with return of normal urine output, but his nausea was refractory to anti-emetics and his creatinine continued to rise. He subsequently underwent kidney biopsy which showed only mild acute tubular injury. Serum creatinine peaked at 10.4 mg/dL on day 3 of hospitalization and then trended down to 3.9 mg/dL by day 8, at which point the patient was asymptomatic and was discharged to home. Within one week as an outpatient creatinine normalized to 1.1 mg/dL.

DISCUSSION: Cannabinoid hyperemesis syndrome (CHS) is an increasingly recognized condition in which longstanding marijuana users experience bouts of intractable vomiting. While anti-emetic medications are generally ineffective for this condition, hot showers tend to provide temporary symptom relief and marijuana cessation is the definitive cure. There have been at least 6 recent case reports of acute kidney injury secondary to CHS, in which patients presented with creatinine levels ranging from 3 to 10 mg/dL which normalized within 1 to 5 days of fluid resuscitation. This entity, recently termed Cannabinoid Hyperemesis Acute Renal Failure, is thought to result from severe volume depletion from a combination of cyclic vomiting and frequent hot showers. Though our

patient denied taking hot showers, he suffered additional dehydration from doing roof work under very hot conditions. With a growing prevalence of marijuana use in this country, it is important to take a thorough social history with all patients, recognize CHS and renal failure as serious risks of long-term marijuana use, and counsel patients accordingly.

NEW ONSET ASCITES OF NON PORTAL HYPERTENSION ORIGIN: WHAT SHOULD WE BE THINKING? Raktim K. Ghosh¹; Kulsoom Fatima¹; Sakthiraj Subramanian². ¹St. Vincent Charity Medical Center, An affiliate of Case Western Reserve University, Cleveland, OH; ²st vincent charity medical center, Cleveland, OH. (Tracking ID #2159147)

LEARNING OBJECTIVE #1: Serum ascites albumin gradient (SAAG) value <1.1 g/dL identifies ascites of non portal hypertension origin. Some of the common etiologies of low gradient ascites include tuberculous peritonitis-induced ascites, malignancy-induced ascites, pancreatic ascites, renal ascites and serositis-induced ascites

LEARNING OBJECTIVE #2: TB peritonitis and malignant ascites may not be detected in the initial ascitic fluid analysis. Often diagnosis of peritoneal metastases or TB peritonitis can only be obtained by laparoscopy, which provides a direct view of the lesions and biopsy samples of the peritoneal lesions.

CASE: A 55 years old male patient with PMH of pulmonary TB 15 years ago, was admitted with complaints of abdominal distension and occasional vague pain at the flanks for last 3 months. He also reported night sweats, low grade fever and mild nausea for similar duration. He denied any recent history of vomiting, loss of appetite, weight loss, jaundice, change in bowel habit, recent exposure to an active TB patient, HIV, prison confinement, chronic cough and chest pain. Review of system was negative for PMH of chronic alcoholism, pancreatitis, heart disease, hepatitis and venous thrombosis. The pertinent physical examination findings included distended abdomen with fullness at the flanks and positive shifting dullness. There was no stigmata of chronic liver disease. Initial labs including CBC, electrolytes, liver enzymes, bilirubin, INR, amylase and lipase were unremarkable. The computed tomography scan showed abdominal and pelvic ascites and enhancement of mesentery suggestive of infectious process. The patient underwent diagnostic peritoneal tap and fluid analysis showed total white count of 2500, PMN count of 1 %, low adenosine deaminase, high protein 5.3 gm/dL and high albumin 3.1 gm/dL. The serum albumin was 3.3 gm/dL, suggesting a non portal hypertension origin of ascites as SAAG was <1.1 g/dL. Cytology analysis of fluid showed reactive mesothelial cells, macrophages, lymphocytes but no evidence of malignancy. The fluid was sent for AFB culture which was reported negative after 6 weeks. T spot was negative. Laproscopic biopsy of omentum was consistent with adenocarcinoma of stomach. The patient also underwent EGD which showed deep serpiginous appearing ulcer in the pre-pyloric area. Histopathological examination showed adenocarcinoma of stomach with signet ring.

DISCUSSION: Accumulation of fluid within the peritoneal cavity results in ascites. In the United States, ascites is most often due to portal hypertension resulting from cirrhosis which accounts for approximately 80 % of cases. Some of the common etiologies of low gradient ascites (SAAG <1.1 g/dL) include tuberculous peritonitis-induced ascites, malignancy-induced ascites, pancreatic ascites, renal ascites and serositis-induced ascites. Ascites with low gradient SAAG can often become a diagnostic challenge as two commonest etiologies i.e. TB peritonitis and malignant ascites may not be detected in the initial ascitic fluid analysis. The neoplasms most frequently associated with ascites are ovarian, breast, colon, stomach and pancreatic adenocarcinomas. Overall sensitivity of cytology smears for the detection of malignant ascites is 58 to 75 % which increases to more than 90 % after 2nd or 3rd fluid analysis. However, our patient did not have any peritoneal fluid after initial tap for reanalysis. Almost all patients with peritoneal carcinomatosis have positive ascitic fluid cytology due to the presence of viable malignant cells exfoliating into the ascitic fluid but only two third of the cases of malignant ascites are due to peritoneal carcinomatosis. Malignant ascites from other mechanisms including lymphatic vessel obstruction, portal hypertension from metastases or heart failure will have negative fluid cytology. TB peritonitis and malignant ascites when associated with portal HTN from liver metastases or cirrhosis may have a SAAG >1.1 g/dL making it more of a diagnostic challenge in which case history and high degree of suspicion is required to make the diagnosis. The early use of upper endoscopy in patients presenting with gastrointestinal complaints may be associated with a higher rate of detection of early gastric cancers. Examination of AFB smear and peritoneal fluid AFB culture have very low diagnostic yield. Often diagnosis of peritoneal metastases or TB peritonitis can only be obtained by laparoscopy, which provides a direct view of the lesions and biopsy samples of the peritoneal lesions.

NEW ONSET SEIZURE SECONDARY TO ENERGY DRINK CONSUMPTION

Kiruba Vembu; Diane Book. Medical College of Wisconsin, Milwaukee, WI. (Tracking ID #2199370)

LEARNING OBJECTIVE #1: Recognize rare causes of new onset seizures, including overconsumption of energy drinks

LEARNING OBJECTIVE #2: Identify the clinical presentation and toxicity associated with caffeine use

CASE: A 21 year old male presented to the ED after a sudden loss of consciousness and two minutes of tonic clonic seizure activity witnessed by his colleagues; the episode lasted approximately two minutes. Vitals on admission were as follows: blood pressure 152/72, heart rate 103, temperature 98.1 degrees F, respiratory rate 18 and oxygen saturation of 98%. Upon arrival, he was found to have post ictal symptoms including disorientation and slowed speech. Further history obtained from the patient revealed that he had consumed two bottles of a commercial energy drink immediately prior to the onset of seizure activity. Upon arrival to the ED, he received 2 mg lorazepam with noted improvement in mental status. A CT of the head was performed and was negative. The basic chemistry panel was significant for a sodium level of 134 mEq only. Complete blood count showed an elevated white blood count of 12.6. Lactic acid was elevated at 4.5 mmol/L. He was then admitted, but had no further seizures during the hospitalization. MRI was performed, and was negative. Urine toxicology screening was negative. Additional questioning on admission revealed that he had no significant medical history, including seizure or mental health history. He also denied a family history significant for seizures.

DISCUSSION: Since energy drinks first came to the market in 1997, sales growth has increased substantially, with billions of beverages sold a year. Since their introduction, these products have been reported to be associated with neurological events, including seizures. We report the case of a new onset seizure in the adult population, most likely secondary to rapid energy drink consumption. Since energy drinks are classified as dietary supplements, ingredients are not regulated by the Food and Drug Administration (FDA). Literature search shows that cases of new onset seizure have been associated with common energy drink ingredients including caffeine, guarana, and taurine; all of these have been considered as potential seizure triggers. Caffeine is the primary psychoactive ingredient in the majority of energy drinks; by increasing catecholaminergic tone, it can have proconvulsant effects. Since caffeine follows zero order kinetics, seizures can arise in a dose dependent manner. The initial effects of caffeine toxicity are non specific and include tachycardia and headache, both of which our patient experienced. These symptoms can be followed by altered mental status, seizure, hypotension and arrhythmia. Ingredients such as guarana, a natural caffeine additive derived from a plant known to have the highest concentration of caffeine in the world, also increase the caffeine content in these beverages. However, heavy consumption of energy drinks are commonly associated with other behaviors that also lower the seizure threshold such as concurrent alcohol use or sleep deprivation; thus, a direct link between new onset seizure and energy drink use is difficult to establish. Further studies will be required to elucidate the risk of seizure precipitation in otherwise healthy adults that consume more than the recommended amount of energy beverages.

NON-TUBERCULOSIS MYCOBACTERIAL (NTM) RENAL INFECTION
Jeremiah K. Sisay, M.D.; Venkata Ghanta, M.D., M.S.; Raymond Munoz, M.D..
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LEARNING OBJECTIVE #1: Recognize NTM renal infection presenting as unexplained hematuria in an immunocompetent patient

CASE: A 45 year old, morbidly obese, Hispanic man presented to the hospital complaining of bilateral flank pain and gross hematuria, which began the night prior to admission. He described the pain as 10/10 in severity, constant, with radiation to the inguinal region and partially relieved with pain medications. He also complained of dysuria, frequency and urgency of 1 week duration. He presented with similar symptoms (bilateral flank pain, hematuria) to another hospital 1 year prior to admission and was treated with antibiotics for pyelonephritis, although neither his urinalysis nor urine culture showed evidence of infection. Following discharge, the patient remained asymptomatic until the described episode. The patient did not take medications, denied tobacco, alcohol and substance abuse, worked as a truck driver and lived with his wife and children. He immigrated to the US from Mexico many years prior to presentation and denied recent travel. He reported a family history of "heart problems." Review of systems was significant for fever, chills, night sweats, and a 30 lb unintentional weight loss over the past year. Physical examination was significant for tachycardia, and fever to 101.6 °F. Otherwise, he was in no acute distress and had a benign physical exam except for an enlarged prostate on rectal examination. Pertinent laboratory data included leukocytosis to 22,000/uL with 88 % neutrophilia and hematuria. CT abdomen/pelvis with contrast revealed pelvic, inguinal and abdominal lymphadenopathy, seen on a previous CT scan approximately 1.5 years prior, with noted enlargement of the left pelvic lymph nodes. Evaluation included urine and blood cultures which showed no growth, left inguinal lymph nodal biopsies which showed benign, reactive features, PPD test with controls and Quantiferon gold test which were negative. Urine was submitted for AFB smears and cultures. The

patient was treated empirically with vancomycin and piperacillin/tazobactam and his symptoms resolved. Several weeks following discharge, his mycobacterial cultures grew *Mycobacterium avium* complex (MAC). The patient was seen post-discharge in the outpatient clinic with complete resolution of his symptoms and was scheduled for cystoscopy.

DISCUSSION: Genitourinary infections caused by NTM are rarely reported. Among the expected risk factors for NTM disease, it is commonly believed that preexisting pulmonary conditions are most common. However, many cases of NTM disease occur in patients with concurrent illnesses or in patients taking immunosuppressive medications (1). Several studies have shown that MAC is the most common pathogen causing post-transplant NTM disease (1, 2, 3). Notably, one fourth of patients with NTM disease from a study in New York City did not have a known risk factor, which suggests the possibility of a unique genetic susceptibility or environmental exposure in immunocompetent patients (1). In a retrospective review of genitourinary infections caused by NTM conducted in the University Hospital of Taiwan from 1996 to 2008, 15 patients were identified and 11/15 had underlying co-morbid conditions, with the most common being chronic renal disease. Only one patient had AIDS while three had malignancy. The majority of these patients presented with fever, followed by characteristic symptoms of urinary inflammation (dysuria, frequency or urgency) (4). A case report described NTM infection causing acute kidney injury in a patient with CKD stage 3. The patient was treated with levofloxacin for 2 weeks with clinical improvement and serum creatinine returned to baseline (5). The pathogenesis and optimal treatment regimen of genitourinary NTM in immunocompetent patients remains poorly understood. However, case reports and series are emerging and should encourage clinicians to consider NTM in their differential diagnosis of both immunocompromised and immunocompetent patients presenting with genitourinary symptoms. **References:** 1. Bodle EE, et al. Epidemiology of Nontuberculosis Mycobacteria in patients without HIV, New York City. *Emerg Infect Dis.* March 2008; 14(3): 390-396. 2. Kotloff RM, et al. Pulmonary complications of solid organ and hematopoietic stem cell transplantation. *Am J Respir Crit Care Med.* 2004 Jul 1; 170(1):22-48. 3. Jie T, et al. Mycobacterial infections after kidney transplant. *Transplant Proc.* 2005 Mar; 37(2):937-9. 4. Huang CT, et al. Genitourinary infections caused by nontuberculous mycobacteria at a university hospital in Taiwan, 1996-2008. *Clin Microbiol Infect* 2010; 16: 1585-1590 5. Brener ZZ, et al. Acute kidney injury in a patient with nontuberculous mycobacterial infections: a case report. *Cases J.*2009; 2:83.

NOT ALL CHEST PAINS ARE THE SAME Vassiliki Pravodelov. Boston University Medical Center, Boston, MA. (Tracking ID #2199336)

LEARNING OBJECTIVE #1: Recall the clinical signs, diagnostic approach, and treatment of Graves' disease.

LEARNING OBJECTIVE #2: Identify non-cardiac causes of chest pain.

CASE: A 55 year old woman with history of hypercholesterolemia presented with chest pain. Three days prior to presentation, while sitting in her office, she had three episodes of 3/10 chest discomfort associated with palpitations and dyspnea. On the evening prior to admission she had a 3/10, non-radiating mid-sternal chest pain "like a brick on the chest" that was constant and worsened to 10/10 through the night. Associated symptoms included dizziness, diaphoresis that felt like a hot flash, and dyspnea. Upon further questioning, she reported having worsening knee pain and swelling by the end of the day bilaterally, hot flashes, palpitations, and hand tremors over the past three weeks. She also noted voice hoarseness, sore throat sensation, and odynophagia. She had been taking a daily herbal laxative for constipation. She denied any history of radiation. Family history was unremarkable. The patient was hemodynamically stable and not in distress. Exam was notable for mild proptosis, lid lag, and restricted right lateral gaze without prominent exophthalmos. She had mild tremor on arm extension and her deep tendon reflexes were 2+ throughout. Her thyroid exam showed a non-tender mildly enlarged thyroid without palpable nodules. Her skin exam was normal. Laboratory studies were significant for normal cardiac enzymes thrice, hypercalcemia with corrected calcium level 10.9 mg/dL, mild normocytic anemia with hemoglobin 11.4 g/dL, and normal kidney and liver function. The thyroid panel indicated primary hyperthyroid state with thyroid stimulating hormone (TSH) below detectable levels, and elevated total Triiodothyronine (T3) >400 ng/dL (above assay) and total Thyroxine (T4) 15.6 ng/dL. Parathyroid hormone (PTH) and Vitamin D levels were normal. Thyroid peroxidase antibodies and thyroid stimulating immunoglobulins were both present and elevated. Hemoglobin A1c was 5.5 % and lipid panel showed LDL 89 mg/dL, HDL 29 mg/dL, and total cholesterol 132 mg/dL. Her ECG showed normal sinus rhythm without ischemic changes and the patient had no events on cardiac telemetry. She was started on propranolol to decrease sympathetic stimulation. Her clinical picture was not consistent with thyroid storm as she was hemodynamically stable. She had a thyroid radioactive iodine uptake scan (RAIU) that showed diffuse homogeneous radiotracer uptake at 4 h and 24 h consistent with Graves' disease. She was started on methimazole and was seen in endocrinology clinic. Long-term treatment options were discussed with the patient, including methimazole,

radioactive iodine ablation, and thyroidectomy. The patient remained on methimazole and was referred to ophthalmology for evaluation of Graves' orbitopathy.

DISCUSSION: This patient was admitted to the medical floor as a "typical chest pain rule out". However, by carefully taking the patient's history and performing a full physical exam, we were able to soon identify her underlying medical problem, which was thyrotoxicosis. Chest pain rule-outs are one of the most common reasons for hospital admission. It is important to constantly remind ourselves that chest pain may be a manifestation of many different conditions, especially in patients at low risk for cardiac disease. Graves' disease is one of the most common autoimmune disorders affecting the thyroid gland. It is characterized by the presence of circulating antibodies that bind and stimulate TSH receptors, resulting in hyperthyroidism and diffuse enlargement of the thyroid gland (goiter). Graves' disease has multiple extra-thyroid manifestations, the most common of which is ophthalmopathy. The diagnostic hallmark of thyrotoxicosis is elevated T3 and T4 with undetectable TSH. Symptoms of thyrotoxicosis include chest pain, tachycardia, palpitations, tremors, anxiety, weight loss, and hypercalcemia. The diagnostic criteria for Graves' disease are thyrotoxicosis with at least one of the following: detectable serum TSH receptor antibodies, evidence of ophthalmopathy and/or dermopathy, diffuse and increased RAIU. In our patient, her laboratory findings, history, and physical exam all supported thyrotoxicosis and Graves' disease was confirmed with evidence of proptosis on exam and increased RAIU. Treatment usually starts with the use of anti-thyroid medications (methimazole or propylthiouracil) with goal to restore euthyroidism. Methimazole is used more often due to its better side effect profile compared to propylthiouracil. Once euthyroidism is achieved, multiple options exist, including long-term anti-thyroid drugs, radioactive iodine ablation, or surgery. Our patient remained on methimazole as about 30 % of patients on this medication remain in remission. Beta-blockers can be used to alleviate symptoms of thyrotoxicosis, such as palpitations and tremors, before euthyroid state is achieved, something that our patient benefited from.

NOT ALL VALVE VEGETATIONS ARE ENDOCARDITIS Christopher M. Begley; Akshay Amarani; Andrew Whipple. Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI. (Tracking ID #2198817)

LEARNING OBJECTIVE #1: Recognize that cardiac papillary fibroelastomas may result in serious complications including stroke, valvular dysfunction or sudden cardiac death

CASE: A 56-year-old man was brought in to the hospital for a 3-week history of intermittent confusion. According to family, his symptoms consisted of short-term memory impairment. No focal sensory or motor deficits were reported. Past medical history was significant for diabetes mellitus, hypertension and coronary artery disease. Physical exam, including vital signs and neurological exam, was unremarkable. Laboratory data showed no abnormalities other than mild hyperglycemia. Computed Tomography (CT) of the head revealed a small ischemic focus in the right pons, with recommended Magnetic Resonance Imaging (MRI) for further characterization. MRI of the brain confirmed this finding and additionally showed small remote lacunar infarcts in right brainstem and left thalamus. On day one of hospitalization, a transthoracic echocardiography (TTE) was performed as an embolic source was suspected. A small to moderate sized mobile mass versus vegetation was visualized on the aortic valve, and transesophageal echocardiography (TEE) was recommended. TEE was performed on day two of hospitalization; findings revealed a pedunculated moderate sized mobile mass on the non-coronary cusp leaflet measuring 0.6×0.9 cm. The mass was thought to be suggestive of a cardiac papillary fibroelastoma. The patient underwent excision of the mass, which was attached to the free margin of the leaflet on a thin stalk, and thus 1×3 mm edge was removed. The patient tolerated the procedure well and was discharged after recovery from surgery. Pathology confirmed papillary fibroelastoma.

DISCUSSION: Primary tumors of the heart are a rare entity, with prevalence estimated to be less than 0.1 %. Papillary fibroelastomas are the second most common primary cardiac tumor behind myxomas. The mean age of patients who develop fibroelastomas is 60 years, with a male predominance. Prior to echocardiography, most tumors were diagnosed post-mortem. Despite the fact that many are found incidentally and are considered pathologically benign tumors, there is great potential for serious morbidity and mortality. Patients may present with stroke secondary to embolism, caused by the tumor itself or subsequent thrombus, valvular dysfunction and possibly sudden cardiac death. Surgery is indicated in patients who are thought to have embolic events related to mobility and for those greater than or equal to 1 cm in size. Grossly, papillary fibroelastomas have been described to have a sea anemone like appearance with multiple papillary fronds attached to the endocardium by a short stalk. The majority of resections do not require valvular repair or replacement. Recurrence following resection has not been reported.

OLD MAN, OLD PROBLEM, OLD MEDICATION, NEW SOLUTION: INNOVATIVE TREATMENT FOR POST-BLADDER CATHETERIZATION PELVIC DISCOMFORT Michelle Devor; Marc Tzorfas. SDVAHCS, San Diego, CA, CA. (Tracking ID #2199407)

LEARNING OBJECTIVE #1: Recognize a treatment option for post-catheterization discomfort in catheter-dependent elders.

LEARNING OBJECTIVE #2: Consider the complexities of treatment decision-making in interventions in the old-old.

CASE: A 94 yo man presented with post-Foley catheterization pelvic and urethral discomfort. Initially diagnosed with BPH in August 2001, he failed medical management and had persistent post-void residuals of 350–450 ccs; urodynamics showed poor detrusor function. Declining indwelling catheterization, chronic intermittent catheterization tid was initiated in June 2008. After suffering 2 symptomatic UTIs in 2013, felt related to his decline in dexterity and vision and his accelerating fixation on catheterization (performing the procedure more than 10 x per day), indwelling catheterization was initiated in January 2014. Following catheterization, the patient complained of urethral pain, urgency and pelvic discomfort particularly at night. Mechanical manipulations and in-home education failed to alleviate symptoms. At day 14 post-catheterization, Pyridium® 95 mg tid was started; symptoms improved within 24 h. The dose was decreased to 95 mg qhs, which maintained the good response, and was then changed to PRN. By early March 2014, he was no longer needing the medication and has not needed it since. He has had one symptomatic multiorganism UTI within the first month felt related to sterile technique during a catheter change.

DISCUSSION: Phenazopyridine (Pyridium® is an azo (R-N=N-R') dye, with an unknown mechanism of action, used as an oral urinary tract analgesic, adjunctive to antimicrobial therapy for cystitis. Adverse drug events include discoloration of the urine, GI disturbance, rash, pruritus and, most concerning, anaphylactic reactions, hepatotoxicity, methemoglobinemia, hemolytic anemia, renal and hepatic toxicity, though those the latter are dose-dependent and seen primarily in overdose situations. There is scant clinical data for efficacy and safety as a urinary tract analgesic or for any of the indications listed in the Pyridium® insert, and no published studies trialing phenazopyridine in patients who have difficulty tolerating the discomfort of chronic indwelling Foley catheters. Urologists employ it for endoscopic procedures, one of the insert's indications. One study of women undergoing GYN surgery showed no effect of phenazopyridine on post-operative pain care (1). As might be expected, there are no studies or reports of its use in nonagenarians. The decision to initiate a chronic indwelling Foley in this elder was reached after considerable thought and discussion as his functional status and quality of life was excellent despite several limiting conditions. Disturbing his status quo was risky and the resultant discomfort was trying. Phenazopyridine offered palliative treatment for his discomfort with no adverse consequences and was able to be weaned off after a period of adjustment to the catheter. Any intervention in a nonagenarian must be undertaken with caution weighing the proposed benefits against potential complications and impacts on quality of life. There is little "precedence" in this population since, just by virtue of their age, they represent unique physiology that permits such longevity. We contend that clinicians consider the use of phenazopyridine in elders who suffer from post-catheter urinary tract pain and urgency, though caution must be taken as this one case report cannot be generalized to all elders, and others may experience adverse consequences from this poorly studied medication. Reference: 1. Anderson C, Chimhanda, M, Sloan J et al. Phenazopyridine does not improve catheter discomfort following gynecologic surgery. Am J Obstet Gynecol 2011; 204–267. e1-3.

ONE ADMITTING DIAGNOSIS LEADS TO A SECOND DIAGNOSIS Kanapa Kornsawad²; Sadie Trammell Velasquez¹. ¹University of TX Health Science Center at San Antonio, San Antonio, TX; ²University of Texas Health Science Center, San Antonio, TX. (Tracking ID #2188592)

LEARNING OBJECTIVE #1: Identify unusual causes of hemolytic anemia

LEARNING OBJECTIVE #2: Identify the high value of Vitamin B12 testing in patients with anemia

CASE: A 34-year-old woman presented with 2 months of generalized fatigue and was found to be in Diabetic Ketoacidosis. She has a history of Type I Diabetes Mellitus. Review of systems was notable for malaise, dizziness and dyspnea on exertion. She was diagnosed with gastroparesis and anemia one month ago without a clear etiology. Physical examination revealed pale conjunctiva. Laboratory data was significant for a white blood cell count (WBC) 7.5 K/uL, hemoglobin 6.0 G/dL, Mean Corpus Volume (MCV) 102 fL and platelets 67,000 K/uL. Peripheral blood smear showed evidence of hemolysis with schistocytes with hypersegmented neutrophils, thrombocytopenia and teardrop cells (see picture). Other significant labs included vitamin B12 68 pg/mL, low reticulocyte count, total bilirubin 2.3 mg/dL, lactate dehydrogenase (LDH) level 7642 IU/L and haptoglobin <8. The patient was given two units of packed red blood cells with minimal response. She was started on intramuscular B12 supplementation with subsequent improvement of her anemia, thrombocytopenia and normalized of the LDH and transaminase levels. Work up for the etiology of her Vitamin B12 deficiency revealed positive anti-intrinsic factor (IF) antibody, specific for a diagnosis of pernicious anemia.

DISCUSSION: Hematological findings in cobalamin or vitamin B12 deficiency include anemia, leukopenia, thrombocytopenia, macrocytosis and hyperpigmented neutrophils. Approximately 10 % of the patients have life-threatening hematological manifestations with symptomatic pancytopenia, “pseudo” thrombotic microangiopathy and hemolytic anemia. In our patient, she met criteria for “pseudo” thrombotic microangiopathy with hemolytic anemia (elevated LDH, low haptoglobin), thrombocytopenia and schistocytosis in the setting of low B12 level. Patients with pseudo-TMA are found to have a very high LDH, low reticulocyte count and thrombocytopenia. The patient’s low Vitamin B12 and a positive anti-intrinsic factor antibody demonstrated she had Vitamin B12 deficiency due to pernicious anemia which resulted in severe intramedullary hemolysis and ineffective erythropoiesis. General Internists should be aware and consider vitamin B12 deficiency in a patient with anemia, which can present as mechanical hemolysis and thrombocytopenia.

PAIN IN THE NECK: RECOGNIZING THE SIDE EFFECTS OF INTRAARTICULAR CORTICOSTEROID INJECTIONS Michael Weinreich¹; Joseph Conigliaro². ¹North Shore - LIJ School of Medicine, Manhasset, NY; ²North Shore LIJ Health System, New Hyde Park, NY. (Tracking ID #2196710)

LEARNING OBJECTIVE #1: Diagnose adrenal suppression in patients receiving intraarticular corticosteroid injections.

LEARNING OBJECTIVE #2: Recognize risk factors for adrenal suppression.

CASE: A 57-year-old female with a history of chronic neck pain from a motor vehicle accident presented to our office after a syncopal episode. For the past 9 years she has received steroid injections for her chronic neck pain. During the evaluation of the etiology of her syncope, she was found to have a sodium of 118 mmol/L and orthostatic hypotension with a 45 point increase in her heart rate as she moved from lying to standing. The remainder of her evaluation revealed negative intracranial imaging, normal echocardiogram, absence of arrhythmias on EKG and telemetry, and a normal electroencephalogram. She was found to have a serum AM cortisol level of 0.9 ug/dL and her serum ACTH was < 5 pg/mL, consistent with secondary adrenal insufficiency believed to be as a result of chronic steroid injections. She was treated with oral corticosteroids with resolution of her hyponatremia and symptoms.

DISCUSSION: Corticosteroid injections are a common treatment for a variety of articular pathologies. Intraarticular (IA) steroids, are systemically absorbed and cause negative feedback on the production of ACTH by the anterior pituitary. This results in decreased cortisol production by the adrenal cortex, which can precipitate an adrenal crisis. While this mechanism is a well described phenomenon in the use of oral steroids, it has been poorly described in the IA injection literature. A small case series of 25 patients with rheumatic joint disease noted that corticosteroid injections resulted in suppression of the pituitary-adrenal axis for up to two weeks following a single injection. Other case reports have also noted seizures, syncope, and adrenal insufficiency post IA injections, not to mention local side effects and joint degeneration. There is scant data on the long-term side effects among patients receiving chronic steroid injections. The American College of Rheumatology recommends joint injections at intervals of no more than once every 3 months. The steroids most commonly utilized, listed in order of decreasing popularity of use, are methylprednisolone acetate, triamcinolone hexacetonide, and triamcinolone acetonide. Triamcinolone hexacetonide has the lowest level of systemic absorption but is not widely utilized. Patients with IA corticosteroid joint injections can experience a reduction in serum cortisol level by 21.5 % for 3 days after injection. Those at highest risk for adrenal-pituitary axis suppression include pediatric patients, the elderly, those with steroid injections at intervals greater than every 3 weeks, and those with a long-term history IA injection. As joint pain is a common ailment managed by General Internists, awareness of this therapeutic side effect is vital to recognizing adrenal suppression in patients with a history of chronic IA corticosteroid injections.

PANCREATIC PARESIS: A CASE OF PARANEOPlastic WEAKNESS Nehal Patel¹; Bartley J. Gill¹; Christina Otterness¹; Zaven Sargsyan^{1, 2}. ¹Baylor College of Medicine, Houston, TX; ²Michael E DeBakey VA Medical Center, Houston, TX. (Tracking ID #2199183)

LEARNING OBJECTIVE #1: Recognize necrotizing autoimmune myopathy (NAM) as a cause of sudden-onset proximal muscle weakness and creatinine kinase (CK) elevation in cancer patients

LEARNING OBJECTIVE #2: Prevent the contribution of statin therapy to muscle injury in the hospitalized patient

CASE: A 53-year-old man admitted for work-up of a pancreatic mass began reporting significant weakness during his hospital stay. Prior to admission, he had experienced 6 months of epigastric pain, 40-lb weight loss, and fatigue. A 2×2 cm pancreatic head mass was discovered on abdominal CT. His admission exam was notable for jaundice,

epigastric tenderness, and a normal neurological exam including strength. Initial laboratory studies included an AST of 786 U/L, ALT of 681 U/L, alkaline phosphatase of 1135 U/L, and total bilirubin of 19 mg/dL. CA 19-9 was 2274 U/mL. Several EGDs with EUS were performed, as fine needle aspirations of the mass were initially non-diagnostic. Pathology eventually reported atypical cells suggestive of adenocarcinoma. While undergoing this work-up, the patient developed rapidly worsening proximal muscle weakness over several days. Proximal strength had worsened to 2/5 in his legs and 4/5 in his arms. Distal muscle strength remained normal, along with sensation, reflexes, and bulbar muscle function. The patient had been on atorvastatin, which was immediately discontinued, but careful review of new medications revealed none that affected its metabolism. Laboratory workup showed a creatinine kinase (CK) of 3068 U/L, which ultimately peaked at 44,000 U/L. Anti-Jo and ANA were normal. Electromyogram showed myotonic discharges consistent with myositis. Muscle biopsy of the left quadriceps revealed degenerating and regenerating myofibers without fiber type grouping or perivascular inflammation, as well as focal endomysial capillary dropout. These features were consistent with necrotizing autoimmune myopathy (NAM) with minimal inflammation. The patient was treated with high-dose steroids and intravenous immunoglobulin (IVIg), with a subsequent normalization of CK levels and moderate improvement in proximal lower extremity weakness. He is currently preparing for chemoradiation therapy.

DISCUSSION: Weakness is a common symptom encountered by the general internist, and inflammatory myopathies must be considered in its differential. This group of disorders encompasses polymyositis, dermatomyositis, inclusion body myositis, and the recently recognized necrotizing autoimmune myopathy (NAM). The symptoms of NAM are similar to those of polymyositis: progressive, symmetric proximal muscle weakness and elevated CK levels. The key distinguishing pathologic feature of NAM is necrosis of muscle fibers with absent or minimal inflammation. Similar to polymyositis and dermatomyositis, NAM has also been associated with malignancy. NAM can also be triggered by statins, but with a rare prevalence of 1 in 100,000. In this patient’s case, we believe the etiology of NAM was paraneoplastic, with a possible exacerbation by atorvastatin use. No standardized guidelines are available for the treatment of NAM. Expert opinion supports a trial of oral prednisone 1 mg/kg as first-line treatment, with addition of methotrexate, azathioprine, or IVIg in refractory cases. Response to treatment varies from partial to full functional recovery. This case highlights the importance of considering paraneoplastic myopathy as a cause of proximal muscle weakness in a patient with malignancy, and to utilize muscle biopsy to distinguish NAM from other autoimmune myositides. Furthermore, the possible contribution of statin therapy to our patient’s myopathic processes emphasizes the importance of early discontinuation of statins in acute settings of suspected muscle or liver injury.

PE WITH 0 WELLS CRITERIA Gen Yamada²; Christine Kwan¹. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Sapporo, Japan. (Tracking ID #2194452)

LEARNING OBJECTIVE #1: Diagnose pulmonary embolism (PE) when Wells criteria is 0

CASE: A 65-year-old Asian man presents with 4 months’ acute-onset, worsening chest pain ever since hospital discharge following his cervical cord injury. Initially, the intermittent right chest pain lasts a few minutes and occurs once/week, but it has gradually worsened to 30–60 min/episode for 3–5 times/day with bilateral involvement. The pain is squeezing, radiating to his back and shoulders, 10/10, not improved by anything, and worsened by deep breaths. He also reports low-grade fever ($T_m=38$), palpitations, dry cough, dyspnea, and left>right leg heaviness. Other review of systems is within normal limits. The patient’s past medical history includes constipation and cervical cord injury from a fall while he is drunk 7 months ago; he has been hospitalized for 3 months for rehabilitation after which he can now walk. He takes magnesium dioxide, baclofen, and dantrolene; he has no allergies. He has smoked 3 packs/day for 40 years and drunk 5 cans of beer/day but quit both 7 months ago. He has no family history of cardiovascular disease. On physical exam, vital signs include temperature 36.5, blood pressure 101/50, heart rate 77, respiratory rate 18, and oxygen saturation 98 % room air. Heart exam shows regular S1 and S2 with no tenderness to palpation, murmurs, gallops, or rubs. Lungs are clear to auscultation bilaterally. His extremities show no edema or palpable cords. On neurological exam, his motor strength is 4/5 except for 2/5 dorsiflexion of the bilateral feet. The rest of his exam shows no abnormalities. On labs, the patient’s complete blood counts, chemistry panel, and cardiac enzymes show no abnormalities except for increased CRP at 19.4 mg/dL (normal: 0–0.3) and D-dimer at 5.8 mcg/mL (normal: <1). His chest x-ray and electrocardiogram demonstrate no irregularities. Enhanced chest computed tomography (CT) is obtained, which reveals large clots in the right common iliac vein and bilateral pulmonary arteries with infarction. For his PE, he is started on heparin with transition to warfarin; a hypercoagulability panel, including protein C and S, antinuclear antibody, anticardiolipin antibody, and antithrombin III are negative. His chest pain improves within several days.

DISCUSSION: Because of nonspecific symptoms and signs, PE is difficult to diagnose and can mimic other diseases, such as acute coronary syndrome, pericarditis, and pneumonia. Typical symptoms include dyspnea (73 %), pleuritic chest pain (66 %), cough (37 %), and leg swelling/pain (28 %), some of which occur in the above patient. The sensitivity, unfortunately, of some PE signs of tachycardia and tachypnea are only 30 and 20 %, respectively, with specificity of 70 and 90 %. When using Wells criteria to assess the clinical probability of PE, the above patient has no clinical symptoms of a deep venous thrombosis (DVT), and heart rate is <100/min. While he does have a history of immobilization, it is >4 weeks ago; he also has no previous DVT/PE, hemoptysis, or malignancy. His Wells score is, thus, 0, denoting a low (6 %) probability of PE, as opposed to a high (>6) Wells score with a 49 % chance of PE. In fact, 16 % of patients have a false negative result on Wells criteria. While D-dimer is also non-specific (46 %), it can, however, be meaningful when no alternative diagnosis better explains the patient's illness, like the above.

PECULIAR CASE OF CEREBROVASCULAR ACCIDENT PRESENTING AS HEMIBALLISMUS Muhammad Sarfraz Nawaz¹; Gaurav Goyal¹; Toufik Mahfoud Haddad¹; Pranathi R. Sundaragiri¹; Temple Brannan². ¹Creighton University School of Medicine, Omaha, NE; ²Nebraska-Western Iowa Veterans Affairs Medical Center, Omaha, NE. (Tracking ID #2191582)

LEARNING OBJECTIVE #1: Recognize hemiballismus as initial presentation of acute cerebrovascular accident (CVA)

LEARNING OBJECTIVE #2: Highlight management of movement disorders in the setting of acute CVA

CASE: A 72-year-old Caucasian male with past history of ischemic CVA, hypertension, diabetes mellitus, peripheral vascular disease and nicotine dependence presented with frequent involuntary jerking movements of the right upper and lower extremities for 1 week duration. The symptoms initially started as twitching of right shoulder and progressively worsened. The symptoms were absent during sleep but were prominent during the day and interfered with his activities of daily living. The patient denied numbness, tingling, limb weakness, loss of consciousness, seizure-like activity, headaches or visual changes. He had no family history of seizure or movement disorders. Physical examination revealed an elderly male, oriented and alert with elevated blood pressure of 206/111 mm Hg with uncoordinated and unintentional movements of the right upper and lower extremities causing him to have a limp during ambulation. Muscle strength was 4/5 in left biceps, triceps and hip flexors and 5/5 in other muscle groups, normal muscle tone and sensations, and absence of atrophy. Patellar reflexes and Babinski's sign were negative bilaterally. Routine laboratory parameters were normal except for a hemoglobin A1C of 11.8 %. Computed tomography (CT) scan of the head showed chronic right-sided thalamic lacunar infarct. Magnetic resonance imaging (MRI) of the brain confirmed chronic right thalamic infarct and new small sub-acute infarcts in left lentiform nucleus. MR angiogram of the head was limited by severe motion artefacts but did not demonstrate any obvious vascular stenosis or cessation of flow. The patient was medically optimized on aspirin, simvastatin, haloperidol and lorazepam. The hemiballismus was attributed to the lentiform nuclear infarction. Patient's hyperkinetic movements dramatically reduced in intensity over the next 3 days and he was asymptomatic with no residual neurological issues at 3 month follow-up.

DISCUSSION: Hyperkinetic disorders like chorea and hemiballismus are rare manifestations of an acute CVA (0.5–1 %).¹ However, CVAs are the most common cause of acquired chorea and hemiballismus in adults. Other causes of non-genetic hemiballismus include non-ketotic hyperglycemia, encephalitis and vasculitis.² Movement disorders secondary to cerebral ischemia most commonly involve the contralateral lentiform nucleus, followed by the contralateral cortical, thalamic and subthalamic regions, although rare cases of ipsilateral subthalamic lesions with ipsilateral hemiballismus/hemichorea have been reported as well.^{2–3} Diagnosis involves the use of CT scan and/or MRI, the diagnostic yield of which can be improved by using MR angiography.⁵ Treatment of CVA-related hemiballismus follows conventional stroke guidelines with additional therapy for prevention of movement-disorder related injury.² Both neuroleptics and benzodiazepines have been shown to be successful in managing symptoms of excessive involuntary movements.⁴ Hemiballismus usually resolves within 2–3 months, but can take up to 1 year in some cases.² In rare refractory cases, stereotactic surgery and deep brain stimulation can be very successful in managing the symptoms.² Presence of such symptoms may delay the diagnosis of an acute stroke and the subsequent therapy. This case report underscores the need for a high level of suspicion for such cases to ensure timely and appropriate management. **References:** 1. Handley A, Medcalf P, Hellier K, Dutta D. Movement disorders after stroke. *Age Ageing*. 2009;38(3):260–6. 2. Hawley JS, Weiner WJ. Hemiballismus: current concepts and review. *Parkinsonism Relat Disord*. 2012;18(2):125–9. 3. Chung SJ, Im JH, Lee MC, Kim JS. Hemichorea after stroke: clinical-radiological correlation. *J Neurol*. 2004;251(6):725–9. 4. Vidaković A, Dragasević N, Kostić VS. Hemiballismus: report of 25 cases. *J Neurol Neurosurg Psychiatr*.

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PENILE PAIN: A PERPLEXING PRESENTATION Joshua Feuerstein²; Hao Feng¹. ¹Yale University, New Haven, CT; ²Yale-New Haven Hospital, New Haven, CT. (Tracking ID #2191729)

LEARNING OBJECTIVE #1: Recognize the presentation of metastatic cancer to the penis

LEARNING OBJECTIVE #2: Identify causes of penile pain

CASE: This is an 86 year-old male with a history of high grade recurrent bladder cancer and chronic urinary retention who presented to the hospital with intractable penile pain. In June 2013, he was incidentally noted to have high grade T1 bladder cancer during a TURP for BPH with two recurrences over the following year. In October 2014, he began having pelvic pain for which he made multiple visits to the Urology clinic and the Emergency Room. The pain was located on the ventral shaft of his penis without radiation. It was associated with hardening of the penis which progressively worsened over the next 2 months. He denied any fevers, chills, masses, skin changes, penile discharge, or new medications. Aspiration of the penis was attempted on two separate occasions to rule out priapism, however only scant blood was obtained. Imaging included an MRI of the pelvis which showed no evidence of penile fibrosis (although limited due to motion) and a penile ultrasound with dopplers which demonstrated mild skin thickening around the penile shaft with normal blood flow. No etiology was found and so he was prescribed acetaminophen/codeine and asked to follow with his primary care doctor for pain management. In late November he again presented to the ER for intractable penile pain, not responsive to IV medications, and was admitted to the medicine service for pain management. His medical history was significant for mild dementia and significant medications included trazodone. His exam was notable for a semi-erect and engorged penis, but was not painful to palpation. There was no skin change, rash, lymphadenopathy, discharge, or abnormal shape. Lab work was unremarkable, with a normal creatinine and normal urinalysis. A CT of the pelvis was obtained which showed left hydroureter, thickened bladder wall, and minimal subcutaneous edema of the penis without focal mass or drainable collection. Given the unclear diagnosis and intractable pain, the decision was made to do an exploration of the penis. Cystoscopy was unrevealing and exploration showed the spongiosum was enlarged and firm. However, biopsies of the periurethral and corporal tissue revealed high grade papillary urothelial carcinoma and FNA of an inguinal lymph node showed the same, providing the likely etiology of his pain. Body CT revealed metastatic disease to the bone and lung, along with enlarged pelvic and inguinal lymph nodes. The decision was made not to treat, but rather proceed with hospice care.

DISCUSSION: The differential diagnosis for penile pain should include emergencies such as priapism, fracture, and paraphimosis, along with less urgent conditions such as Peyronies disease, infection, neuropathy, and chronic pain syndrome. Malignancy must always be on the differential as well. Malignancy typically presents as a single or multiple infiltrative nodules, ulcerative lesions, induration, malignant priapism, and swelling of the penis. Other less common presentations include pain, hematuria, obstructive voiding symptoms, and pseudophimosis. Our patient presented with swelling and pain, without the typical skin changes or masses, illustrating the high index of suspicion needed for diagnosis. Penile metastatic lesions are rare, with approximately 400 cases reported as of 2006. Metastases to the penis are usually associated with disseminated neoplasm, and commonly affect the shaft or glans of the penis more than the prepuce. The most common primary tumors are urothelial bladder cancer and prostate adenocarcinoma, mainly spread via the retrograde venous route. The highest concern in our patient was for priapism. Malignant priapism, which presents as edema and rigidity, has been reported in between 20 and 53 % of patients with penile metastasis. The pathogenesis is due to infiltrative tumor cells causing venous occlusion or cavernosal thrombosis. This is different than true priapism, where there is actual tumescence of the corpora cavernosa. Treatment for malignant priapism is mainly restricted to surgery or radiation. As in our patient, metastatic penile lesions are usually associated with disseminated neoplasm, and unfortunately carry a poor prognosis (average life expectancy of 9 months). Our patient had presented to many different providers with complaints of pain with the actual diagnosis remaining elusive for months. It required exhausting all diagnostic tests and even proceeding to surgery before the etiology of his pain was eventually found.

PERSISTENT FEVER IN AN IMMUNOCOMPETENT PATIENT WITH A VENTRICULOPERITONEAL SHUNT Heidi Alvey¹; Sagger Mawri²; Jainil Shah². ¹Henry Ford Health System, Southgate, MI; ²Henry Ford Hospital, Detroit, MI. (Tracking ID #2198858)

LEARNING OBJECTIVE #1: Diagnosis and treatment of fungal meningitis in an immunocompetent patient

CASE: Patient is a 52 year old male presenting with a chief complaint of persistent fever. Patient has a past medical history of hypertension, hyperlipidemia, diabetes, coronary artery disease, and gender reassignment surgery (female to male) 30 years ago with testosterone supplementation. He initially presented to an outside facility 1 month prior with complaint of headache and dizziness. Imaging showed a cerebellar infarct, which subsequently developed significant hemorrhagic conversion. He underwent a suboccipital craniotomy for elevated intracerebral pressures with impending herniation. His course was complicated by obstructive hydrocephalus, which required the placement of a ventriculoperitoneal shunt, and vent dependent respiratory failure requiring a tracheostomy and gastrostomy tube placement. Through patient's course at the outside facility, he was persistently febrile, but had negative blood, urine, and respiratory cultures. Multiple courses of broad spectrum antibiotics were given without defervescence. Fever was thought to be of central origin. He was then transferred to a long term care facility. After transfer, patient was persistently febrile, and began to have worsening tachycardia, tachypnea, and hypotension. He was transferred from the care facility to the intensive care unit with concern of sepsis. On arrival, patient was afebrile, mildly tachycardic, and hypotensive. He was oxygenating well on minimal vent settings. Examination revealed rhonchi with thick tracheostomy secretions, regular heart sounds without murmur, non-tender and non-distended abdomen with clean and dry gastrostomy site. He was unresponsive, with only minimal flexion in his upper extremities to pain. A urinary catheter and upper extremity central venous catheter were in place with no signs of infection. Over the next 24 h, patient became persistently febrile and increasingly tachycardic. Cultures were taken from multiple sites and the patient was started on empiric broad spectrum antibiotics with vancomycin, cefepime, and metronidazole. Blood cultures were negative; urine culture grew candida that persisted even after catheter exchange. Respiratory cultures grew only commensal flora. Imaging of the chest, abdomen and pelvis did not show any evidence of pulmonary embolism or fluid collections. Imaging of the head showed an intact ventriculoperitoneal shunt and evidence of his previous stroke. Neurosurgery was consulted, and a lumbar puncture and tap of the shunt reservoir was done. The cerebrospinal fluid was xanthochromic with elevated protein, low glucose, and a leukocytosis with neutrophilic predominance. Both lumbar puncture and ventriculoperitoneal shunt cultures grew yeast, with negative viral and bacterial cultures. He was empirically started on amphotericin B and flucytosine, which was deescalated to high dose fluconazole after the organism was speciated to a pan-sensitive *Candida parapsilosis*. A retinal exam showed candida retinitis without vitritis. Echocardiography was negative for vegetations. HIV testing was negative. Repeat cerebrospinal fluid studies showed persistence of the candida species, so the patient was taken to the operating room for externalization of the shunt on hospital day 10. The patient did well postoperatively, and the external drain was clamped and subsequently removed on hospital day 16. Repeat cerebrospinal fluid specimens demonstrated clearing of the organism. Over the hospital course, patient became more alert and was moving extremities spontaneously. His fevers subsided after initiation of appropriate antimicrobial coverage. He was discharged to a nursing facility to complete an 8 week course of intravenous fluconazole.

DISCUSSION: *Candida parapsilosis* is an uncommon cause of meningitis in immunocompetent patient, usually affecting neonates, only rarely causing central nervous infections in adults. Risk factors for development of candidal meningitis include immunosuppression, malignancy, AIDS, corticosteroid use, prolonged usage of central venous catheter, and previous or current VP shunt. Studies in neonates have shown prolonged usage of externalized central devices like catheters or ventricular drains significantly increase the risk of candidal meningitis. *C. parapsilosis* is commonly found on the hands of healthcare workers, with one study showing colonization of up to 25 % staff. Consensus is lacking regarding treatment agents and duration. Several case reports indicate success using amphotericin B, flucytosine, and/or fluconazole. In the case of this patient, removal of the devices (central catheter and shunt) in addition to appropriate antimicrobial therapy lead to improvement in the patient's clinical status. It is important to keep a high index of suspicion for fungal infectious etiologies in the critically ill patient, especially when artificial devices are present.

PERSISTENT HYPOGLYCEMIA IN A YOUNG PATIENT WITH METASTATIC MALIGNANT PHEOCHROMOCYTOMA Farrell Tobolowsky. University of Texas at Houston, Houston, TX. (Tracking ID #2199636)

LEARNING OBJECTIVE #1: To recognize that pheochromocytoma can cause hypoglycemia in rare cases

CASE: C.W. is a 42 year-old male with no past medical history who presented to the hospital with worsening abdominal pain. The patient stated that the pain was located on the right side of the abdomen with radiation to the mid-back and right shoulder blade. Review of systems was positive for diaphoresis, night sweats, fatigue, facial swelling, intermittent headaches, palpitations, enlarged lymph nodes of the neck, decreased appetite and a 7-lb unintentional weight loss for the past 2 months. Family history was notable for prostate cancer and diabetes in his father. Physical examination showed facial edema,

bilateral submandibular lymphadenopathy, tachycardia, and tenderness to palpation in the right lower and upper quadrants. C.W. was admitted to the medicine team, and abdominal computed tomography showed a large right adrenal mass with areas of necrosis and cystic change as well as multiple lesions in the liver and retroperitoneal lymphadenopathy. Further investigation revealed extremely elevated urine metanephrines (1082 ug/24 h), confirming a diagnosis of pheochromocytoma. C.W.'s hospital course was complicated by persistent hypoglycemia despite nutrition supplementation, with postprandial glucose as low as 43. He was subsequently transferred to the intensive care unit (ICU) for higher level of care. While in the ICU, C.W. was started on a D10NS infusion, total parenteral nutrition, and tube feeds via a Dobhoff. Although the patient was eventually able to wean off the D10 infusion, he continued to rely on total parenteral nutrition to maintain normal glucose levels. Further workup for the etiology of C.W.'s hypoglycemia revealed low insulin (<0.5 uIU/mL), low c-peptide levels (0.19 ng/mL), and normal cortisol (19.3 ug/dL). Patient had an insulin-like growth factor II of 409 ng/mL and growth hormone level of 0.3 ng/mL, both values in the reference range. Preactalbumin was also found to be decreased at 11.7 mg/dL. The patient was started on prednisone per endocrinology recommendations, which helped to increase the patient's appetite. Symptomatic management of the pheochromocytoma was initiated with metoprolol, doxazosin, and diltiazem to control heart rate and blood pressure. The patient underwent three cycles of chemotherapy with cyclophosphamide, vincristine, and dacarbazine, unfortunately with minimal response.

DISCUSSION: According to the literature, patients with pheochromocytoma often have hyperglycemia due to excess catecholamine production. Additionally, 26 to 50 % of patients develop diabetes mellitus from impaired insulin release (Nove Press Med, 1981). However, some patients with a pheochromocytoma can instead have hypoglycemia after surgical removal of the tumor as catecholamines are decreased. Consequently, alpha and beta adrenoreceptors are no longer stimulated to increase glycogenolysis, gluconeogenesis, and inhibit insulin release (J Clin Invest, 1967). Few case reports have been published that illustrate hypoglycemia in these patients, even before resection of the tumor. In general, cancer patients are more likely to have hypoglycemia, with the most common mechanism being overproduction of insulin-like growth factor 2 (IGF-2) (Horm Res, 1994). Our patient had normal levels of serum IGF-2, making this mechanism an unlikely cause of hypoglycemia. Furthermore it is expected that low insulin and c-peptide levels would have predisposed the patient to hyperglycemia due to impaired uptake of circulating glucose. C.W.'s persistent hypoglycemia was thought to be secondary to poor oral intake for the two months before admission (as evidenced by low prealbumin), local effects of the tumor in the liver, and a large adrenal tumor burden. These patients often have a "limited hepatic glucose reserve secondary to tumor burden in the liver" as our patient did with his multiple liver lesions (Endocr, 2010). In one published case report, the use of F-2-fluoro-2-deoxy-D-glucose positron emission tomography/computed tomography (PET/CT) imaging illustrated increased direct uptake of glucose due to the metabolic activity of the tumor extensively infiltrating the body. Although our patient's hypoglycemia appears to be multifactorial and this imaging was not available in our facility, it would be useful in determining the cause of hypoglycemia in these patients with metastatic malignant pheochromocytoma. Although this case is rare, it is important to recognize that both local and metastatic pheochromocytoma can present with hypoglycemia instead of hyperglycemia.

PERSISTENT MYCOBACTERIUM ABSCESSUS INFECTION SECONDARY TO INTERFERON GAMMA AUTOANTIBODIES Roshni Naik; Jose A. Cortes. Beth Israel Medical Center, New York, NY. (Tracking ID #2200235)

LEARNING OBJECTIVE #1: Recognize that persistent nontuberculous mycobacteria infections may be due to an acquired immunodeficiency such as interferon gamma autoantibodies.

LEARNING OBJECTIVE #2: Recognize the prevalence of interferon gamma autoantibodies among the Asian population.

CASE: A 78 year old female of Filipino descent with chronic hepatitis C initially presented with back pain. Thorough evaluation of back pain revealed chronic thoracic osteomyelitis with bone biopsy culture growing *Mycobacterium abscessus*. The patient developed bacteremia despite several antimicrobial therapies including amikacin, azithromycin, ciprofloxacin, ertapenem, ethambutol, isoniazid, linezolid, meropenem, pyrazinamide, rifampin, and tigecycline. The patient underwent surgical removal of T11/12 vertebral body with titanium cage placement but remained persistently bacteremic. Given her multi-drug resistance, the patient was sent to National Institutes of Health for further evaluation, and was found to have interferon gamma autoantibodies. The patient received immunotherapy including rituximab and interferon alpha for five years, and consequently bacteremia cleared. The patient clinically improved and since then she has not had any nontuberculous mycobacteria infection.

DISCUSSION: Interferon gamma is important in providing protection against intracellular organisms such as mycobacteria, salmonella, and dimorphic mold. This cytokine stimulates

monocytes/macrophages, specifically by increasing their microbicidal activity, promoting antigen presentation function, and stimulating the production of proinflammatory cytokines on contact with microbial stimuli. There have been 29 case reports that described nontuberculous mycobacteria infection in non-HIV adult patients with interferon gamma autoantibodies. Majority of the cases involved patients of East and South East Asian descent, including Thai and Taiwanese population. These patients presented with severe disseminated infections, involving the lymph nodes, lungs, skin, bone marrows, bone, and/or soft tissue. The most commonly isolated mycobacterium were *Mycobacterium chelonae* and *Mycobacterium avium* complex. Other reported opportunistic organisms cited include Cytomegalovirus, *Burkholderia coccovenans*, *Aspergillus*, *Candida*, *Salmonella*, *Streptococcus pyogenes*, and *Mycobacterium tuberculosis*. These patients may have severe disease with prolonged course despite multiple antibiotics treatment. Studies have reported that treatment with interferon gamma, immune globulin, and plasmapheresis has been unsuccessful. This patient was included in a study in which rituximab was administered and resulted in the clearance of the infection, reduction in antibody titer, and improvement in interferon-gamma signaling. The activation for the production of interferon gamma autoantibodies is unknown, which warrants further investigation.

PITUITARY APOPLEXY: A RARE CLINICAL PRESENTATION OF RHABDOMYOLYSIS AND ALTERED MENTAL STATUS Nilsa M. Jimenez², Prashant Grover¹. ¹St.Francis Hospital and Medical Center, Hartford, CT; ²University of Connecticut Health Center, Manchester, CT. (Tracking ID #2198691)

LEARNING OBJECTIVE #1: Recognize an uncommon but life threatening cause of severe hyponatremia.

CASE: A 45 year-old orthodontist male with past medical history of hypertension presented to the emergency department with 1 day history of altered mental status and 10 days history of positional headache, fatigue, problem with manual dexterity and lower extremity muscle pain. Physical examination was unremarkable except for a temperature of 100.0 F, blood pressure of 173/57, and waxing waning mental status. Initial investigation revealed serum sodium of 108 mmol/L (135–145 mmol/L), which was likely the cause for the altered mental status and an elevated creatinine kinase (CK) at 4094 U/L (30–170 mosmo/kg). During hospitalization his CKs peaked to 16,000 associated with renal failure. He was initially treated with hypertonic saline which slightly raised his serum sodium and improved his mental status. A CT scan of the brain done to rule out other causes of altered mental status showed a small hypodensity in the right basal ganglia region. A follow up MRI of the brain showed a pituitary adenoma with increase signal intensity consistent with hemorrhage confirming the diagnosis of pituitary apoplexy. Endocrinological evaluation revealed a low TSH, ACTH, cortisol, FSH, LH and GH consistent with hypopituitarism and secondary adrenal insufficiency due to apoplexy. He was immediately started on stress dose steroid, hydrocortisone 100 mg every 6 h until his sodium remained above 120 mmol/L as well as thyroid replacement with dramatic return to baseline. He was seen by neurosurgery as an outpatient and underwent a transnasal endoscopic resection of the pituitary adenoma. Pathology revealed a macroadenoma with fresh hemorrhage.

DISCUSSION: Pituitary apoplexy is uncommon but is life-threatening condition if overlooked. More uncommon is to see rhabdomyolysis in pituitary apoplexy. It is not unusual to see hyponatremia in hypopituitarism; this could be a form of secondary syndrome of inappropriate antidiuretic hormone (SIADH) or it could be secondary to subnormal secretion of aldosterone. However, it is a rare presentation to see rhabdomyolysis in patients with hypopituitarism and to date there is very limited data on this topic. There have been isolated case reports linking hypothyroidism with spontaneous rhabdomyolysis due to hypothyroid myopathy. Another explanation could be water intoxication due to cortisol deficiency in hypopituitarism. Cortisol has a significant effect on body water regulation by regulating the extra cellular fluid preventing the water moving into cells. Once this process is inhibited, water intoxication causes cellular edema and lysis of the muscle cells. Hence, serum chemistry, cortisol, and creatinine kinase level should be checked to prevent organ damage such as acute kidney injury. Remembering the patient with hypopituitarism and adrenal insufficiency secondary to pituitary apoplexy can present with rhabdomyolysis and hyponatremia is important and timely management is crucial to reduce mortality.

PLEURAL MYCOBACTERIUM AVIUM COMPLEX INFECTION IN AN IMMUNOCOMPETENT YOUNG FEMALE WITH NO RISK FACTORS Ravi P. Mangani; MIsbahuddin Khaja; Karen Hennessey; Omonuwa Kennedy. Lincoln Medical Center, New York, NY. (Tracking ID #2198030)

LEARNING OBJECTIVE #1: Lymphocytic Predominant Pleural Effusions Must raise suspicion of Mycobacterial Disease

LEARNING OBJECTIVE #2: In case of Mycobacterial Lung disease, If preliminary Investigations are unyielding, Pleural Biopsy Must be Pursued to make the diagnosis. Yield from Cultures of PLeural Fluid are not always reliable.

CASE: *Mycobacterium Avium* Complex (MAC) infections rarely affects the pleura, accounting for 5-15 % of pulmonary MAC. There is paucity of reports of pleural MAC infection in the immunocompetent population. We report a case of MAC pleurisy and pleural effusion in an otherwise immunocompetent young patient with no predisposing factors. Our case is a 37 year old healthy female with no past medical history who was admitted to the hospital with 2 weeks of right sided pleuritic chest pain, productive cough and fever after a trip to Algeria. She denied history of ill contact. On exam she was febrile, tachycardic, tachypneic with signs of right sided pleural effusion which were confirmed by Chest X-ray and chest CT. Thoracentesis revealed lymphocytic predominant exudative fluid. The patient was placed on respiratory isolation for suspicion of mycobacterial tuberculosis infection until ruled out, three days later. The patient underwent pleural biopsy, Bronchoscopy with Broncho-Alveolar Lavage and Video Assisted Thoracoscopic Surgery (VATS), all of which failed to identify the causative organism. Six weeks later, MAC was identified in the pleural fluid and pleural biopsy samples. Based on these results, patient was started on clarithromycin, ethambutol, rifampin and isoniazid. After 6 months of treatment, she was asymptomatic with complete resolution of the right pleural effusion. She continues to have therapy to complete a 12 month regimen and has remained asymptomatic to date.

DISCUSSION: Pleurisy and pleural effusion caused by MAC in an immunocompetent host is rare and can prove to be a diagnostic challenge for physicians. The presence of lymphocytic effusion should raise the suspicion for both tuberculous and nontuberculous mycobacterial disease and pleural biopsy must be considered to make the diagnosis. The exact pathogenesis of MAC pleurisy remains obscure and possibilities include entry of MAC into the pleural fluid through a transient bacteremia, or contiguous spread from a sub-pleural focus. Clinicians should have a high index of suspicion of MAC infection in an otherwise immunocompetent patient presenting with a unilateral lymphocytic exudative effusion.

POETRY IN DIAGNOSIS: A CASE OF POEMS SYNDROME Simeng Sun; Carolina Bernabe; Matthew Harrington. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2200340)

LEARNING OBJECTIVE #1: Recognizing POEMS syndrome in patients with multiorgan dysfunction

CASE: Seventy-seven year-old male with systolic heart failure (EF 28 %), hypothyroidism, and CKD stage 3 presented with dyspnea on exertion and paresthesias in all four extremities. Physical exam revealed anasarca. CT scan of chest/abdomen/pelvis revealed large volume ascites, pericardial and pleural effusions. Transthoracic echocardiogram revealed large pericardial effusion without evidence of tamponade physiology. Initial labs revealed hemoglobin 12.4 g/dL, BUN 54 mg/dL, Cr 4.01 mg/dL, Albumin 3.6 g/dL. Paracentesis was performed and 10 l of ascites was removed; SAAG of 1.8 indicated portal hypertension to be the etiology of the ascites. Abdominal ultrasound revealed hepatic steatosis, normal kidneys, and patent portal vein. Viral hepatitis panel and HIV screen were negative. Serum immunofixation revealed monoclonal gammopathy with IgM lambda spike. Serum free kappa/lambda ratio was normal. Abdominal fat pad biopsy ruled out amyloidosis. Bone marrow biopsy demonstrated no plasma cell dyscrasia. Serum vascular endothelial growth factor (VEGF) level was found to be elevated on ELISA (120). The patient fulfilled criteria for POEMS syndrome (polyneuropathy, organomegaly, endocrinopathy, monoclonal protein, skin changes) based on polyneuropathy, monoclonal IgM lambda gammopathy, elevated serum VEGF and volume overload. The patient's hospital course was complicated by perforated cholecystitis, peritonitis, and liver abscess, which was treated with drainage and antibiotics.

DISCUSSION: POEMS syndrome is a rare multisystem disorder with unclear etiology and variable clinical presentation. Diagnosis of POEMS syndrome is challenging. The Mayo Clinic criteria for diagnosis of POEMS syndrome require peripheral neuropathy and monoclonal plasma cell disorder. In addition, patients must fulfill 1 of 3 major criteria (osteosclerotic bone lesions, elevated VEGF or Castleman's disease), and 1 of 6 minor criteria (endocrinopathy, skin changes, organomegaly, extravascular volume overload, thrombocytosis/polycythemia or papilledema). Although no standard treatment currently exists for POEMS syndrome, early therapy may begin upon diagnosis, ideally prior to multi-organ involvement. Treatment may include hematopoietic stem cell transplant, radiation, and chemotherapy (i.e. Melphalan plus dexamethasone or agents such as Lenalidomide, Thalidomide or Bortezomib). Unfortunately, our patient's disease was advanced on presentation; he agreed only to supportive therapy. POEMS syndrome is often misdiagnosed or under-diagnosed due to its rarity and complexity. This diagnosis should be considered in patients with multi-organ system dysfunction of unclear etiology.

POLYARTICULAR GOUT FLARE MASQUERADING AS SEPSIS Deep Shah¹; Gopi Mohan¹; Peter Fleuckiger²; Frank Corrigan¹; Doyt Conn¹. ¹Emory University School of Medicine, Atlanta, GA; ²Wake Forest School of Medicine, Winston-Salem, NC. (Tracking ID #2154169)

LEARNING OBJECTIVE #1: Recognize that acute gout may trigger a non-infectious systemic inflammatory response syndrome

LEARNING OBJECTIVE #2: Identify the clinical pitfalls in distinguishing between acute and chronic gouty arthritis

CASE: A 64-year-old African American man with a history of chronic tophaceous gouty arthropathy, hypertension, and stage 3 chronic kidney disease presented with 4 days of severe pain in his left foot and ankle associated with fevers, fatigue, and weakness. He denied a history of recent trauma, illness, sexual activity, or new medications. The patient reported recently completing two courses of corticosteroids for acute gout flares. On physical exam, he was uncomfortable and diaphoretic. His vitals showed a temperature 38 °C, pulse 126 beats per minute, blood pressure 141/86 mmHg, and respiratory rate 14 breaths per minute. Purulent-appearing material drained from open wounds on the first and fourth toes of the left foot. The whitish exudate and soft tissue swelling obscured a probe-to-bone test. In addition to the left foot and ankle, his left metatarsophalangeal joints, left ankle, right ankle, and several proximal interphalangeal joints were warm and mildly tender to palpation. Bilateral olecranon-bursa nodules were appreciated. Laboratory findings revealed a white blood cell count 18,700/ μ L (16.5 K/ μ L bands), CRP 42.5 mg/L, and ESR 120 mm/hr. Plain film radiography of the left foot was concerning for osteomyelitis of the first toe. The patient was initially managed for sepsis secondary to osteomyelitis and a possible superimposed cellulitis. Despite broad-spectrum antibiotics and intravenous fluid resuscitation, the patient remained febrile and tachycardic with a persistent leukocytosis. General surgery was consulted for potential operative intervention given the presumed diagnosis of left great toe osteomyelitis. Further evaluation with magnetic resonance imaging of his left foot and ankle showed nonspecific inflammatory changes without clear evidence of osteomyelitis. In addition, gram stain and culture of the exudate from his open wounds was negative for microorganisms. Examination of the purulent-appearing material under polarized light microscopy revealed copious negatively birefringent urate crystals. Oral prednisone was initiated and antibiotic therapy discontinued. The patient's fever, tachycardia, and pain in all affected joints improved rapidly. Blood and wound cultures remained sterile.

DISCUSSION: The differential diagnosis for acute polyarthritis associated with constitutional symptoms and abnormal vital signs is fairly narrow. Our patient's presentation was not consistent with a viral infection triggering a reactive arthritis or a new drug exposure precipitating serum sickness. Crystal-induced arthritis may present with pain in multiple joints; however, in patients with a history of poorly controlled gout, distinguishing acute and chronic features of their disease process is challenging and fraught with clinical pitfalls. This case illustrates an acute polyarticular gout attack with systemic inflammatory response syndrome (SIRS) masquerading as sepsis. Distinguishing these two entities, which often present with similar findings, is challenging for several reasons. First, our patient's previous flares were not associated with abnormal vital signs, drainage of purulent-appearing material, or radiography suggestive of osteomyelitis. Polyarticular gout flares, though, may present as pseudosepsis, characterized as a systemic inflammatory response due to a non-infectious etiology. In mouse models, it has been demonstrated that monosodium urate crystals, serving as danger signals, can activate the intracellular inflammasome complex. This triggers release of cytokines and ultimately a sterile systemic inflammatory response. A similar mechanism has been postulated for pseudogout-induced SIRS. In addition, on physical exam, liquefied monosodium urate crystals may be mistaken for purulent exudate as seen in this case. Finally, chronic tophaceous gout leads to nonspecific inflammatory changes in bones and joint spaces that may appear similar to osteomyelitis on plain film radiography and mimic a source of infection. In patients suffering from chronic tophaceous gout, it is important to recognize that polyarticular gout attacks can induce a SIRS response without an associated infection. As exam and imaging findings may be unreliable, microscopic examination of exudates or synovial fluid with both polarized light microscopy and gram stain is necessary to distinguish this entity from sepsis due to osteomyelitis or other infectious sources. Early recognition may prompt a trial of corticosteroids, thereby avoiding unnecessary antibiotic therapy or surgical intervention. Finally, while both gout and infectious etiologies may initially respond to corticosteroids, sustained improvement off antibiotics with sterile wound and blood cultures indicates a non-infectious process driven by crystal-induced inflammation.

POLYARTICULAR SEPTIC ARTHRITIS AND SELECTIVE IGM DEFICIENCY Tareq Khader; Keyvan Ravakhah. SVCMC, Cleveland, OH. (Tracking ID #2199317)

LEARNING OBJECTIVE #1: Recognize polyarticular septic arthritis

LEARNING OBJECTIVE #2: Diagnose underlying immunodeficiencies in patients with unusual infections

CASE: A 70-year-old lady came to our facility with a painful swollen left knee associated with fever for the past 4 days. She had a history of severe osteoarthritis for which she underwent bilateral knee replacement several years ago. Upon first encounter her

temperature was recorded at 37.7. Her left knee was swollen, erythematous and severely tender with restricted range of motion. Her examination was also remarkable for decreased air entry on the left side with dry basal crackles. No murmurs were appreciated. Arthrocentesis of the left knee revealed 174,000 nucleated cells, and gram positive cocci in pairs. She was started on Ceftriaxone and Vancomycin immediately after the arthrocentesis. The following day she experienced right knee pain, swelling and redness and left shoulder tenderness with restricted range of motion. Both joints were drained. The fluid analysis in the right knee showed a total number of nucleated cell of 197,000, and the left shoulder fluid showed a total number of 79,000 nucleated cells. Both fluids showed gram positive cocci in pairs. The three fluid samples and blood cultures grew streptococcus pneumoniae, sensitive to ceftriaxone. Antibiotics were changed to ceftriaxone. We conducted a search for the source of the streptococcus pneumoniae. A chest CT scan showed chronic, unchanged emphysematous changes on the left lung, but no consolidation was noted. The spleen was clearly seen at the lower cuts of the scan. A trans-esophageal echocardiogram did not reveal any vegetations. Further more, we decided to assess her immune system. She was HIV negative. Her immunoglobulin profile showed normal IgG 1 and IgG 2 and slightly elevated IgG 3 and IgA. Her IgM was significantly reduced at 5. A diagnosis of selective IgM deficiency which put her at a higher risk of unusual gram positive infections was made. She was treated with extensive debridement and prolonged antibiotic therapy. Patient continued to improve and was discharged on ceftriaxone for a total of 6 weeks.

DISCUSSION: Polyarticular septic arthritis has 3 times more mortality risk than myocardial infarction, and the survivor frequently ends up with severe disabilities. It was well known that about 50 % of the cases have an obvious source of their infection. In one case series of 25 patients with polyseptic arthritis which accounted for about 16 % of the total cases of septic arthritis, mortality rate was 30 %, compared to 4 % with monoarticular septic arthritis. Selective IgM deficiency is a rare, mainly acquired and not congenital in adults. Our patient denied any history of recurrent infections of any type during childhood. Majority of acquired selective IgM deficiency are associated with another condition, including hematological and solid malignancies and certain immunological disorders like SLE and RA. Our patient did not have any known history of above disorders but she was recommended to undergo cancer screening as an outpatient.

POLYMICROBIAL FECULENT EMPYEMA: AN UNUSUAL COMPLICATION OF COLON CANCER Dov Shalman; Randall Edson. California Pacific Medical Center, San Francisco, CA. (Tracking ID #2192334)

LEARNING OBJECTIVE #1: Diagnose the underlying cause of polymicrobial empyema.

LEARNING OBJECTIVE #2: Recognize colo-pleural fistula as a possible complication of bowel perforation due to colon cancer, IBD, or other colonic pathology.

CASE: A 72-year-old man with a long history of alcohol abuse but minimal previous contact with health care professionals was brought to the emergency department with progressive left chest and abdominal pain and diarrhea following a fall that occurred 1 week before admission. On admission, he was found to have a loculated pleural effusion with mediastinal shift on chest X-ray and CT chest, concerning for either hematoma or empyema. A thoracentesis was attempted under ultrasound guidance without success, so a chest tube was placed by interventional radiology. Pleural fluid culture was positive for Escherichia coli (pan-sensitive) and Streptococcus constellatus, and the patient was treated initially with 16 days of piperacillin/tazobactam, then 10 days of Penicillin G, and then an additional 8 days of piperacillin/tazobactam. Abdominal CT scan demonstrated thickening of the splenic flexure wall as well as a lobular mass within the splenic flexure of the colon suggesting a carcinoma of the colon with perforation. Colonoscopy was performed, and biopsy confirmed the diagnosis of adenocarcinoma at the splenic flexure. The patient was taken to surgery for extended left colon and partial sigmoid resection, and the surgery team noted near-complete luminal obstruction and perforation. The patient had a prolonged recovery from this procedure, but ultimately underwent decortication of his left lung. At the time of decortication he was noted to have a feculent empyema, which the cardiothoracic surgeons determined was due to colo-pleural fistula. He had a prolonged recovery in the hospital and was ultimately transferred to a skilled nursing facility.

DISCUSSION: Colon cancer is most often diagnosed on routine screening or as a result of evaluation for GI bleeding or obstructive symptoms. This case illustrates an unusual presentation of complicated colon cancer, with perforation at the splenic flexure and contiguous involvement of the pleura via a colo-pleural fistula, resulting in a polymicrobial empyema. A major clue to the diagnosis was the finding of enteric flora in the pleural space, which should always prompt clinicians to search for an intraabdominal source.

PREGNANCY, A STRESS TEST FOR THE THYROID Amy Chen. UCSF, San Francisco, CA. (Tracking ID #2199778)

LEARNING OBJECTIVE #1: Manage subclinical hypothyroidism in adults, during pregnancy, and recognize the relationship of subclinical hypothyroidism with infertility

LEARNING OBJECTIVE #2: Diagnose the different stages of postpartum thyroidism and recognize the need to screen for permanent hypothyroidism after resolution of thyroiditis

CASE: The patient is a previously healthy 34 year-old woman who presented to clinic with palpitations. She was 5 months postpartum and noticed intermittent palpitations for the past month. She denied feeling anxious, tremor, sweating, heat intolerance, or diarrhea. Her exam was only notable for a mild tachycardia with a heart rate of 100 with no thyromegaly, nodules, or lid lag, skin or eye changes. Her initial workup revealed a low TSH <0.03 and elevated free T4. Her thyroid receptor antibodies (both TSI and TBII) were negative and thyroperoxidase (TPO) antibodies were positive. Two months later, her palpitations have completely resolved and a repeat TSH was now elevated to 6.6 and the free T4 was low. She was prescribed thyroid hormone replacement but because she was feeling well, she did not start the medication. Another month passed, and her TSH is higher at 10.7, free T4 at the low end of normal, but TPO antibodies were even higher. At this point, she started thyroid hormone replacement and one month later, both her TSH and free T4 had normalized.

DISCUSSION: Subclinical hypothyroidism is defined as an elevated TSH but normal free T3 and T4 levels. It is currently recommended to treat this condition, which is usually asymptomatic, when the TSH is greater than 10, in patients who have a high risk of progressing to overt hypothyroidism (for example, individuals with a family history of thyroid disease or with a positive TPO antibody), during pregnancy, and in women who are desiring pregnancy with a TSH greater than 2.5. A TSH greater than 2.5 has been associated with decreased fertility and there have been studies to suggest the optimal TSH range for achieving pregnancy is between 0.5 to 2.5. Therefore, it is recommended to screen for subclinical hypothyroidism when working up infertility. At this time universal TSH screening is controversial and there is insufficient evidence for universal screening of women preconception or during pregnancy. Hypothyroidism during pregnancy is associated with both maternal (preeclampsia, maternal hypertension, postpartum hemorrhage, placental abruption) and fetal (low birth weight, fetal demise, preterm delivery, impaired development) complications. If a woman has been diagnosed with subclinical hypothyroidism prior to pregnancy, she is at higher risk for developing overt hypothyroidism during her pregnancy and she should be treated if her TSH is greater than 2.5. Experts recommend a narrower TSH range during pregnancy with trimester specific goals (0.1 to 2.5 during the first trimester, 0.2–3.0 in the second trimester, and 0.3–3.0 during the third trimester). If a woman is already on thyroid hormone replacement prior to pregnancy, more than half of these women will need to increase their dosing and may need a 30 to 50 % in their medication. Women with limited thyroid reserve, iodine deficiency, or underlying Hashimoto's thyroiditis but are euthyroid prior to conception may develop hypothyroidism during their pregnancy. This patient initially presents with symptoms and laboratory data consistent with thyrotoxicosis. Postpartum thyroiditis is the most common form of thyrotoxicosis in the postpartum period. A hyperthyroid phase occurs in the first 6 months and usually resolves spontaneously and is followed by hypothyroidism. The American Thyroid Association recommends screening women who are diagnosed with postpartum thyroiditis in the hyperthyroidism phase with a TSH every 2 months to diagnose the hypothyroidism phase. The majority of women return to euthyroidism 1 year post partum. However, 10 to 20 % of women who return to euthyroidism will eventually develop permanent hypothyroidism. Therefore, experts recommend that women who recover from postpartum thyroiditis be screened yearly with a TSH to evaluate for permanent hypothyroidism.

PREVENTING A PRION PROBLEM: DIAGNOSING AND LIMITING TRANSMISSIBILITY OF CJD IN THE HOSPITAL SETTING Sheena Mathew. NYP Cornell, New York, NY. (Tracking ID #2193686)

LEARNING OBJECTIVE #1: Diagnose patients with dementia and motor deficits with Creutzfeldt-Jakob disease

LEARNING OBJECTIVE #2: Prevent transmission of CJD disease in the hospital setting

CASE: Sixty-six year old female without any past medical history presents with 2 months of progressive gait instability, confusion and memory loss. Her inability to concentrate forced her to leave her job, and new leg weakness and numbness lead to two falls without prodromal symptoms or loss of consciousness. She reported new depression, insomnia and urinary incontinence. She denied fevers, recent travel history, or sick contacts. Her family was concerned about her worsening functional status and brought her into the ED after a negative outpatient workup. She was not taking medications, and has no family history of neurodegenerative diseases. On admission she was afebrile with normal vital signs, a well-nourished female with normal cardiopulmonary and abdominal exam. Strength was 5/5 in all extremities with cogwheel rigidity in bilateral upper extremities and increased tone. Proprioception and cranial nerves were intact, but gait was unsteady, falling backwards when attempting to walk. She was oriented to herself and place, but unable to state the date. Labs found a normal CBC, BMP, folate, copper, TSH ESR, CRP,

negative RPR and borderline low thiamine and vitamin B12. Blood and urine cultures negative. Head CT did not find hydrocephalus, mass, or midline shift. CT chest abdomen and pelvis was negative for malignancy. MRI of the brain found abnormal diffusion gradient in the deep grey matter, and the cerebellum. EEG showed frontotemporal slowing. Lumbar Puncture with special precautions was positive for 14-3-3 and tau protein. She continued to decline during the hospitalization and was bedbound and mute after 2 weeks with new myoclonus. Brain biopsy found vacuolar changes and western blot was positive for PrPsc confirming the diagnosis of CJD. Patient was discharged home with hospice services

DISCUSSION: Creutzfeldt-Jakob disease is a progressive and fatal neurodegenerative disorder that affects approximately one in a million patients per year. This spongiform encephalopathy is due to accumulation of a misfolded prion protein, PrPsc. In the majority of cases there is no identifiable exposure and is considered to be sporadic CJD. Although rare, CJD should be kept in the differential when evaluating patients, particularly age 50s to 60s with a rapid decline in functional status. Patients will exhibit a progressive dementia with one or many of the following symptoms: myoclonus, visual or cerebellar signs, pyramidal/extrapyramidal symptoms, and akinetic mutism. Workup should include a MRI, EEG, and also a lumbar puncture. Typical MRI findings include T2 intensity of the basal ganglia, cerebellum and cortex and restricted diffusion in those areas on DWI. EEG will show spike and wave complexes and possible diffuse slowing, while the CSF fluid will be positive for 14-3-3 and tau protein. According to the CDC criteria, a brain biopsy is the gold standard for diagnosis. However probable CJD can be established with two out of four of classic symptoms and one of three of the above tests positive for CJD. When caring for patient with suspected CJD all caretakers need to be educated on the potential risk of iatrogenic transmission, but only standard universal precautions are required for routine care of these patients. This includes phlebotomy as blood is considered a low infectivity fluid. Corneal tissue, CSF, and brain tissue are considered higher infectivity fluids and do require extra precautions because prion proteins are not killed by standard chemical and antibacterial methods. The WHO has guidelines for sterilizing materials contaminated with high infectivity fluids. No cases of CSF transmission have been reported. The highest rates of iatrogenic transmission actually are found in dural transplant grafts and cadaveric pituitary hormones recipients. Awareness and abiding by protocols make transmission in the hospital setting highly unlikely but caution should be taken when dealing with high infectivity fluids to mitigate risk.

PRIMARILY SUSPECT CHOLANGIOCARCINOMA Allison L. Ramsey¹; Maria Otazo¹; Andrew Caruso¹; Jeffrey T. Bates². ¹Baylor College of Medicine, Houston, TX; ²VA Medical Center, Houston, TX. (Tracking ID #2200185)

LEARNING OBJECTIVE #1: Recognize common malignancies associated with Ulcerative Colitis and Primary Sclerosing Cholangitis

LEARNING OBJECTIVE #2: Understand disease screening protocols for patients with Ulcerative Colitis and Primary Sclerosing Cholangitis

CASE: A 30 year old female with well controlled Ulcerative Colitis (UC) on Mesalamine and Azathioprine presented with 1-week history of right upper quadrant abdominal pain, subjective fevers, nausea and emesis. She denied diarrhea, change in pain with food intake, and no medications helped with her symptoms. She was afebrile (99.6 F) upon presentation with physical exam notable for an ill appearing, jaundiced woman with positive Murphy's sign and severe tenderness in the right upper quadrant. Lab abnormalities included elevated Alkaline Phosphatase (522), ALT (266), AST (144), Total/Direct Bilirubin (4.1/3.6) with no leukocytosis (8.8). Abdominal ultrasound showed a hydropic gallbladder with MRCP significant for beading and narrowing of the common bile duct to 1.2 cm with adjacent soft tissue mass. Further imaging with CT abdomen revealed a 1.6×2.1×2.3 hypodense soft tissue prominence surrounding the extrahepatic common bile duct. These findings were consistent with Primary Sclerosing Cholangitis (PSC) and possible extrahepatic Cholangiocarcinoma (CCA). For diagnosis and relief of her biliary obstruction, ERCP was subsequently performed with biliary stent placement. Fine needle aspiration of the mass revealed adenocarcinoma, consistent with CCA. Her hospital stay was complicated by cholangitis secondary to Extended Spectrum Beta Lactamase (ESBL) E. coli, which delayed further treatment of her malignancy. Follow up CT abdomen 3 weeks later showed increased size of the mass to 3.2×2.6×4.4 cm, with encasement of the portal vein and infiltration of the pancreas. Given the proximity of her tumor to these critical structures, the patient was not a surgical candidate. She was started on induction chemotherapy with Cisplatin and Gemcitabine upon completion of 14 days of Meropenem treatment for her cholangitis

DISCUSSION: This case highlights the importance of suspecting complications such as PSC in patients with UC as well as understanding cancer surveillance recommendations for this population. About 5 % of patients with UC will develop PSC, with associated increased risk of malignancies, such as cholangiocarcinoma and colorectal cancer. Although there is no screening protocol for PSC in patients with UC, PSC can be expected in

individuals with raised alkaline phosphatase, positive pANCA, and the classic “beading” of the common bile duct on MRCP. Colorectal surveillance for patients with UC is established with a screening colonoscopy and extensive biopsies within 8 years of diagnosis. In UC patients who also develop PSC, colonoscopy should be done at the time of diagnosis and annually thereafter. Unfortunately, CCA surveillance is limited, with no currently recommended biochemical marker or imaging modality. ERCP with brush cytology/biopsy sampling has been suggested along with certain serum biomarkers (CA-19-9), but none have been validated, as malignancy is often missed with these methods. Treatment of CCA includes liver transplantation in those with early stage disease, as well as chemotherapy and radiation before surgery to reduce the tumor size.

PRIMARY CARE PEARLS AND PERILS: FIBER SUPPLEMENTATION AND RETROGRADE ENEMAS IN AN ELDERLY PATIENT WITH CHRONIC CONSTIPATION Denzil Etienne; Osei Whyte. SUNY Upstate Hospital, Syracuse, NY. (Tracking ID #2189777)

LEARNING OBJECTIVE #1: Assess constipation—a commonly encountered problem in the elderly—and its management, particularly the indication and perils of fiber supplementation and retrograde enemas in this population.

CASE: A 91 year old Caucasian male was transferred from an outside hospital for rectal bleeding. His past medical history was significant for chronic constipation, hypertension, hyperlipidemia and benign prostatic hyperplasia. The patient reported that he was constipated for the past 3 weeks despite taking daily fiber (polycarbophil) supplementation prescribed by his primary care physician (PCP). He also complained of poor oral intake during this time. His constipation progressively became worse leading his PCP to recommend an over the counter bisacodyl enema which was self-administered. This was the first time the patient had used a retrograde cleansing enema. Self-administration of the enema was followed by bright red blood per rectum as well as severe rectal pain. The patient was brought to the ED where CT of the abdomen and pelvis demonstrated evidence of rectal perforation. He subsequently underwent laparoscopic transverse colectomy. Further clinical course of the patient was uneventful and he was discharged after an 8-day inpatient stay.

DISCUSSION: In the primary care setting, chronic constipation is the second most common digestive complaint particularly in older adults greater than 65 years and is associated with lower quality of life and poorer health outcomes in this population. Fiber supplementation (organic polysaccharides) such as psyllium (eg. Metamucil), methylcellulose (eg. Citrucel), polycarbophil (FiberCon) and wheat dextrin (Benefiber) is frequently prescribed by primary care physicians for the initial treatment of chronic constipation. Fiber supplements generally increase the stools ability to absorb water, but if consistently taken by constipated patients with inadequate fluid intake, they are unable to effectively increase intraluminal volume via water retention and may paradoxically lead to inspissated or hardened stool. Moreover, it has been shown that fiber supplements may worsen symptoms of constipation in patients with slow transit constipation or dyssynergic defecation. Rectal perforation due to self-administration of retrograde enemas is a rarely reported but potentially life-threatening phenomenon. Even in the absence of disease, the rectal wall can be perforated by introduction of a rubber catheter tip for the purpose of administering a cleansing enema. Primary care providers may consider tailoring individualized instructions (eg. video/in-office demonstration) for elderly patients or recommending assistance from a family member/health aide—as this population is more likely to lack the dexterity to self administer enemas in a safe and effective manner

PRIMARY MALIGNANT MELANOMA OF UTERINE CERVIX SIMULATING CERVICAL CARCINOMA Shourya Tadisina¹; Joseph Ramzy¹; Anteneh Tesfaye²; Phani Akella¹; Ujwala Koduru¹; Orimisan Adekolujo¹; Susan J. Smith¹; Radhika Kakarala¹; Madan Arora¹. ¹McLaren Flint, Michigan State University, Flint, MI; ²Medstar Georgetown University Hospital, Washington, DC. (Tracking ID #2199368)

LEARNING OBJECTIVE #1: Recognize the possibility of a primary malignant melanoma of the uterine cervix in patients presenting with postmenopausal vaginal bleeding and a cervical mass.

CASE: A 71 year old Caucasian female, para-4, with no significant past medical history presented with postmenopausal vaginal bleeding for 1 week. Pelvic examination and ultrasound revealed a 3.5×3.4×2.6 cm cervical mass. Biopsy was initially reported as invasive, poorly differentiated carcinoma consistent with non-keratinizing squamous cell carcinoma of the cervix. CT abdomen and pelvis revealed no pelvic lymphadenopathy. She underwent a robotic radical hysterectomy and bilateral salpingo-oophorectomy with resection of parametrium and pelvic lymph nodes. Surgical pathology report was consistent with primary malignant melanoma of the cervix with immunostains strongly positive for vimentin, S-100 and MART-1 with no involvement of the resected lymph nodes. BRAF mutation was negative. A second review of the previous biopsy slides confirmed

malignant melanoma. Post-operative PET scan, brain MRI and CT chest were negative for metastasis. Final diagnosis was primary malignant melanoma of the cervix, FIGO stage IIB. She was followed with regularly scheduled pelvic examinations and PET scans every 3 months with no additional treatment. After 7 months of follow-up, she developed urinary incontinence; cystoscopy revealed a vesico-vaginal fistula. At exploratory laparotomy she was found to have multiple pelvic masses involving the small bowel, omentum, bladder wall and vaginal cuff. The histopathology of the resected masses was consistent with metastatic malignant melanoma. She was treated with 4 cycles of ipilimumab and she remained in complete remission for 32 months.

DISCUSSION: Primary mucosal melanomas arise from melanocytes located in the mucosal lining of respiratory, urogenital and gastrointestinal tract and account for 1 % of all melanoma. About 2 % of these lesions originate in the female genital tract, of which cervical melanomas are extremely rare. Primary malignant melanoma of the cervix is more aggressive with a worse prognosis than cervical carcinoma. It is seen in postmenopausal women who commonly present with vaginal bleeding or vaginal discharge similar to cervical carcinoma. In our patient, an initial histology was erroneously reported as poorly-differentiated squamous cell carcinoma of the cervix. Though rare, physicians must include primary malignant melanoma of the cervix in their differential because its behavior, treatment options and follow-up are extremely different than cervical carcinoma. The prognosis of primary malignant melanoma of the cervix is dismal regardless of the stage at diagnosis and treatment; mean overall survival was 22.9 months for cases reported in the literature. Our patient remained in complete remission for 32 months after treatment of her recurrent metastatic disease with ipilimumab, highlighting the benefit of immunotherapy in a subset of patients with primary mucosal melanoma.

PROCTITIS AMONG MSM: EXPANDING THE DIFFERENTIAL DIAGNOSIS

Sarah J. Knish. UCSF, San Francisco, CA. (Tracking ID #2199558)

LEARNING OBJECTIVE #1: Explore the differential diagnosis for proctitis in men who have sex with men (MSM)

LEARNING OBJECTIVE #2: Diagnose and treat patients presenting with lymphogranuloma venereum

CASE: A 35yo man presented to clinic complaining of bloody rectal discharge for approximately 1 month, consisting of streaks of blood with bowel movements. He reported mild rectal discomfort with defecation. He reports no fevers or chills, no abdominal pain, no nausea, vomiting, diarrhea or constipation. He has a prior history of syphilis, gonococcal (GC) urethritis and Chlamydia trachomatis (CT), all with documented treatment and clearance at the time of presentation. He has no family history of inflammatory bowel disease or cancer. He endorses no recent travel or camping. He is sexually active with men; he reports receptive and insertive anal intercourse as well as oral sex. He has had 7 partners in the last 3 months and rarely uses condoms. On exam, his vital signs were normal; rectal examination revealed no external ulcerations or fissure, no hemorrhoids, induration or fluctuance. He experienced severe pain with insertion of anoscope, but no ulcerations or active bleeding was seen. The patient was treated empirically for rectal GC/CT with 250 mg IM ceftriaxone and 1 g oral azithromycin; laboratory testing returned the following day with a positive result from rectal swab transcription-mediated amplification (TMA) testing for Chlamydia. The patient returned 5 weeks later, now reporting severe, constant rectal pain and purulent, foul rectal discharge. Additionally, he had developed a deep aching pain that had moved up from the pelvic floor into the low back over the last week. Rectal exam now revealed peri-anal tender induration and mucopurulent and bloody discharge as well as a nearly pathognomonic finding of a lymphorrhoid. The patient was treated empirically for GC with 250 mg IM ceftriaxone and was given a 21-day course of doxycycline 100 mg BID given high suspicion for lymphogranuloma venereum (LGV). Testing returned 2 days later; TMA from a rectal swab was positive for gonorrhea and chlamydia, and PCR was positive for lymphogranuloma venereum (LGV).

DISCUSSION: On the differential for proctitis among men who have sex with men, STDs are prominent; these range from ulcerating genital infections (HSV, syphilis) to rectal gonorrhea, rectal Chlamydia trachomatis (D-K serotypes) and lymphogranuloma venereum (LGV). Apart from STDs, diagnoses to consider include food-borne or water-borne infectious diarrhea (E. coli, Salmonella, etc.); opportunistic infections (e.g. CMV colitis) should be considered in immunosuppressed patients. Other gastrointestinal disorders to consider are inflammatory bowel disease, colorectal cancer and lymphoma. Lymphogranuloma venereum (LGV) is a disease that is caused by infection with specific serotypes (L1, L2, L3) of Chlamydia trachomatis. Although these infections are endemic in Africa, southern Asia, and parts of the Caribbean, outbreaks have also been described in developed nations since 2003 among MSM. While the endemic form of the disease is typically manifest as the ‘inguinal syndrome’ with predominant lymphadenopathy, buboes, necrosis and draining tracts, proctitis is the most common presentation during outbreaks among MSM. Rectal LGV presents with anal or rectal pain, discharge,

tenesmus, rectal bleeding and sometimes constipation; systemic symptoms (fever, malaise) may be present. Anoscopic findings may include mucosal friability, ulcerations, masses or polyps, and mucopurulent exudate. The diagnosis of LGV proctitis is made by LGV-specific PCR from a rectal sample; standard TMA testing for Chlamydia will also be positive, but will not distinguish between LGV infection and other CT serotypes. While Chlamydia serotypes D-K may be treated with one dose of azithromycin or one week of doxycycline, LGV requires a 3-week course of doxycycline. If buboes are present, they should be drained. Partner testing should be offered as well. Patients presenting with LGV are at high risk for other sexually-transmitted infections and should be screened at regular intervals and offered counseling on reducing the risk of infection.

PROFUSE DIARRHEA IN A PATIENT WITH METASTATIC INVASIVE LOBULAR CARCINOMA Anthony T. Fojo. Washington University, Saint Louis, MO. (Tracking ID #2199284)

LEARNING OBJECTIVE #1: Recognize that malignant metastases to the colonic mucosa can cause secretory diarrhea

CASE: A 65-year-old female with a history of recurrent invasive lobular carcinoma of the breast (ER-positive, PR-positive, and HER2-negative) with signet-ring features and liver metastases was directly admitted from clinic for several weeks of progressive confusion, 30-lb weight loss, and diarrhea. Her family reported four to eight bowel movements daily, including at night, with associated nausea and intermittent vomiting. The diarrhea was watery, moderate volume, and had turned bloody over the past week. Physical exam was notable for marked confusion and frankly bloody stool; vital signs and abdominal exam were unremarkable. Initial labs were significant for a sodium of 148 mmol/L, bicarbonate of 7 mmol/L with an anion gap of 17 mmol/L, and creatinine of 1.99 mg/dl (baseline of 0.9 mg/dl), with normal potassium; these abnormalities resolved with aggressive hydration, as did her mental status changes. Stool osmolar gap was 51 mmol/L, infectious studies and fecal leukocytes were negative, and fecal fat was elevated at 27 %. Serum Chromogranin A and VIP and urine 5-HIAA were within normal limits; gastrin was slightly elevated at 290 pg/ml. A colonoscopy was performed which showed thousands of 3 to 5 mm sessile polyps throughout the entire colon. Biopsy demonstrated poorly-differentiated carcinoma with signet rings that was ER-positive, PR-negative, and HER2-negative. This carcinoma was felt to be consistent with her breast primary.

DISCUSSION: Malignant metastases to the mucosa of the GI tract are rare. After melanoma, breast cancer is the second most likely primary to metastasize to the GI tract, and is more common in lobular than ductal carcinoma. While usually solitary or few in number, when diffuse, such metastases can cause significant diarrhea.

PROTON PUMP INHIBITOR INDUCED ACUTE INTERSTITIAL NEPHRITIS—REMAINING MINDFUL OF THE MEDICATION RECONCILIATION Dr. Jasdeep S. Badwal¹; Dilpreet K. Singh². ¹Baystate Medical Center/ Tufts School of Medicine, Springfield, MA; ²Baystate Medical Center/Tufts School of Medicine, Springfield, MA. (Tracking ID #2199814)

LEARNING OBJECTIVE #1: Recognize that proton pump inhibitors (PPIs) can be implicated in acute interstitial nephritis (AIN).

LEARNING OBJECTIVE #2: Recognize the importance of assessing for new medications on a patient's medication list.

CASE: A 62 year old female with a medical history significant for congestive heart failure on bumetanide, paroxysmal atrial fibrillation on flecainide, and gastroesophageal reflux disease on omeprazole, presented with a 5 day history of fevers, chills, myalgias, weakness, poor oral intake, and lower abdominal pain. Her vital signs and physical examination were unrevealing apart from slight suprapubic tenderness and dry mucous membranes. Laboratory analysis revealed a normal complete blood count (CBC), a marked acute kidney injury (AKI) with a blood urea nitrogen (BUN) of 41, and a creatinine (Cr) of 4.0 (baseline 1.0), urine analysis with 13 white blood cells, 5 % eosinophils, no casts, and urine electrolytes revealing a fractional excretion of urea (FeUrea) of 0.05 % consistent with pre-renal azotemia due to volume depletion. She was commenced on intravenous fluids (IVF) with resolution of her urinary eosinophils within 24 h. However her renal function remained unchanged throughout her course. Nephrology was consulted and the patient underwent a computed tomography (CT) scan of her abdomen that revealed mild perinephric fat stranding of the right kidney. She underwent a negative autoimmune workup including complement, anti-nuclear antibody, anti-glomerular basement membrane antibody, anti-neutrophil cytoplasmic antibodies, immunoglobulin's, and hepatitis panel. A renal biopsy was subsequently performed given her unremitting renal failure and the patient was discharged with instructions for close nephrology follow up for the results. However, she returned two days later with nausea and vomiting, was found to be mildly hyperkalemic and her renal function gradually worsened with a Cr trending to a maximum of 6.9. Her biopsy results revealed acute

interstitial nephritis for which a throughout review of her medication history revealed that she had been commenced on omeprazole a few weeks prior to her initial presentation. In the absence of exposure to other drugs associated with AIN, her presentation was attributed to her new PPI. She was commenced on prednisone, her PPI was discontinued, underwent transient hemodialysis in the acute setting, and had gradual normalization of her renal function over a span of 4 months.

DISCUSSION: Proton pump inhibitors are among the most widely prescribed classes of drugs in the United States, accounting for greater than 112 million prescriptions in 2009. They are generally well tolerated with some data suggesting an increased risk for such conditions as community-acquired pneumonia, clostridium difficile diarrhea, fractures, and magnesium deficiency. Less commonly however, PPIs have also been implicated in AIN, mainly reported as case reports and case series without apparent predilection for any one particular PPI. AIN commonly arises in the setting of drug allergy, autoimmunity, or idiopathically. Typically, renal function deteriorates more indolently in AIN than in comparison to the more acute worsening as seen in acute tubular necrosis (ATN), and without obvious abnormalities on urine analysis as are seen in ATN (e.g. muddy brown casts). Providers should remain cognizant about their patients' medications and recognize the importance of obtaining a throughout medication history including onset of therapy in particular cases similar to this, where the clinical course is unresponsive to conventional therapy.

PSA: PROSTATE SERVICE ANNOUNCEMENT Allison L. Ramsey¹; Crear Gail¹; Jeffrey T. Bates²; Andrew Caruso¹. ¹Baylor College of Medicine, Houston, TX; ²VA Houston Medical Center, Houston, TX. (Tracking ID #2200229)

LEARNING OBJECTIVE #1: Recognize that following PSA levels are not reliable screening tests for small cell variant prostate cancer.

LEARNING OBJECTIVE #2: Recognize that small cell prostate cancer is a rare but aggressive variant of prostate malignancy.

CASE: A 75-year-old man with a history of a partially-resected prostate was admitted with a 2-day history of hematuria and difficulty with urination. Five years ago, he underwent a partial prostatectomy for benign prostatic hypertrophy (BPH) with pathology negative for malignancy; his only medications are tamsulosin and finasteride. This current episode was associated with suprapubic pain, bilateral lower extremity swelling, and facial swelling. On physical examination, he had an elevated blood pressure at 171/100 mmHg, periorbital edema, and a left lower lung field which was dull to percussion. His abdomen was distended with suprapubic tenderness; his prostate was hard, nontender, and had irregular contours, and he had left inguinal lymphadenopathy. Urinalysis showed pyuria and hematuria, and a subsequent computed tomography (CT) scan was notable for a large lobulated prostate mass, bilateral hydronephrosis, and multiple liver and lung lesions with a left-sided pleural effusion. Creatinine was elevated to 2.8 mg/dL and a prostate-specific antigen (PSA) was normal. A prostate biopsy showed poorly-differentiated carcinoma with focal areas of neuroendocrine differentiation; positive staining for the markers PSA, PSAP, CK7, synaptophysin, and CD56; and negative staining for chromogranin and CK20. He was diagnosed with small cell prostate cancer. The patient was initiated on carboplatin and etoposide and had bilateral nephrostomy tubes placed. He completed four cycles of chemotherapy before opting to pursue palliative measures.

DISCUSSION: Historically, prostate cancers have been detected using PSA, and even after diagnosis, this one test has essentially replaced digital rectal examinations (DRE) and imaging as the mode of surveillance both during and after treatment. For the majority of patients, PSA testing is sufficient, due to its specificity to prostate tissue. However, in a subset of patients, PSA levels cannot be reliably used for surveillance. Small cell neuroendocrine carcinoma is an extremely aggressive and rare histological variant which occurs in 0.5–2 % of all prostate cancers. About one-half of cases are pure small cell while the other half are admixed with adenocarcinoma. There is no clear histogenetic origin for small cell prostate cancer, but one theory hypothesizes that this malignancy arises from stem cells. Since these stem cells are not specialized, they do not have the capacity to produce PSA. In contrast to patients with adenocarcinoma, PSA is usually normal in patients with small cell prostate cancer, even in those with metastatic disease. However, other tumor markers consistent with embryonal or neuroendocrine cells, such as CEA or chromogranin A, will be elevated. With these patterns in mind, patients with small cell prostate cancer may merit more thorough surveillance with imaging and DRE. Because of the rarity of the condition, no standard therapeutic regimen has been developed. Platinum based chemotherapy regimens have been attempted in case reports, but small cell prostate cancer is often aggressive and diagnosed in a late metastatic stage which hinders the therapeutic opportunity.

PSYCHOSIS NOS Elisa H. Ignatius. Emory University School of Medicine, Atlanta, GA. (Tracking ID #2199446)

LEARNING OBJECTIVE #1: Identify features of clinical history and exam which suggest non-psychiatric causes for psychosis

LEARNING OBJECTIVE #2: Recognize a rare but potentially reversible cause of new onset psychosis: anti-NMDA receptor (NMDAR) encephalitis

CASE: A 34 year old male with no prior medical history was transferred from a psychiatric facility due to disorientation and tachycardia. He was first evaluated 10 days prior with complaints of "delayed response," right hand paresthesias, and "hearing echoes." Recent stressors included longer hours at work, brief homelessness, increased marijuana use, and a sinus infection for which he had taken amoxicillin. ER work-up showed only THC positive urine and he was discharged home with stress management techniques. He returned 4 days later with command hallucinations and insomnia; labs showed mild leukocytosis (11) and he was discharged with hydroxyzine. Two days later he returned under police custody after attacking his mother. In the ER he was wandering the halls naked, responding to hallucinations and perseverating on religious delusions. CT head was normal and labs were notable for leukocytosis (16), urine positive for THC and CPK 4900 (attributed to police Taser). Neurology and psychiatry agreed this represented new onset psychosis and he received Ativan, Haldol, Benadryl, Risperdal and Thorazine prior to psychiatric admission. Once admitted, he demonstrated aggressive and self-injurious behavior refractory to medications and was quickly brought back to the ER for worsening agitation. In the ED he alternated between relative lucidity (able to answer basic questions) and periods of unresponsiveness, rigidity, diaphoresis, and urinary incontinence. Given the numerous anti-psychotics recently administered plus the elevated CPK, there was initial concern for neuroleptic malignant syndrome versus infectious encephalitis/meningitis. Lumbar puncture showed mild lymphocytic pleocytosis and he was empirically started on broad meningitis coverage and PRN Ativan. Over the next 48 h, the patient developed increasingly frequent periods of autonomic instability characterized by diaphoresis, fevers, hypertension, tachycardia, apnea, rigidity, tearfulness and unresponsiveness. Between episodes he demonstrated repetitive orofacial dyskinesias and cyclical motions of his legs or arms but was initially able to follow commands and answer questions; as the days progressed he drifted further from that baseline. EEG showed global dysfunction, MRI was normal and LP non-revealing so antibiotics were discontinued; recovery time was accelerated by Ativan so this was continued. After conferring with consulting services, NMDA receptor antibody was added onto prior CSF studies. While awaiting results, his autonomic dysregulation became more severe with intermittent tachypnea and hypoxia so he was transferred to MICU, initiated on high-dose steroids and intubated. NMDA receptor antibody subsequently returned positive and patient received 4 days plasmapheresis and 2 days IVIg with gradual improvement. Broad testing for precipitating malignancies including testicular ultrasound, CT chest/abdomen/pelvis, tumor markers were unremarkable. He was extubated and is able to follow commands but continues to exhibit milder intermittent autonomic instability.

DISCUSSION: Anti-NMDA receptor (NMDAR) encephalitis is more common in women and symptoms include memory difficulties, dyskinesia, catatonia, anxiety, mania, social withdrawal and psychosis. Numerous psychiatric journals recommend considering this diagnosis in patients with new-onset psychosis plus any of these cardinal features. Brain imaging is often normal but can show increased FLAIR/T2 signaling in the cortex or medial temporal lobes; EEG is often non-specific and CSF studies show only mild leukocytosis with lymphocytic pleocytosis. Presentation mimics phencyclidine ingestion (which antagonizes the NMDA receptor) as well as schizophrenia, further complicating the diagnosis. Despite exhaustive work-ups, men less commonly have an underlying malignancy (8 % versus 41 % in females); among women, ovarian teratomas are associated. Treatment includes high-dose steroids, IVIg, plasmapheresis and occasionally second line immunosuppressants such as rituximab and cyclophosphamide; long-term treatment to prevent relapses among patients without obvious inciting malignancy may include mycophenolate mofetil or azathioprine. Some reports suggest a correlation between NMDAR and HSV encephalitis; a non-specific viral prodrome is common in many cases. There are currently no links between illicit drug use and NMDAR encephalitis. Internal Medicine doctors are often tasked with identifying the "organic" causes of altered mental status. Though it would be low yield to consider work-up for NMDAR encephalitis in all men in their 30s with new onset psychosis, it is nonetheless an important disease to consider early in the differential given the potential for meaningful neurologic recovery with prompt treatment.

PULMONARY ARTERY SARCOMA: A RARE PULMONARY ARTERY FILLING DEFECT Demetra Gibson¹; Neda Laiteerapong². ¹University of Chicago Medical Center, Chicago, IL; ²University of Chicago, Chicago, IL. (Tracking ID #2193451)

LEARNING OBJECTIVE #1: Recognize the clinical features of pulmonary artery sarcomas

CASE: A 71-year-old woman presented with 6 months of progressively worsening dyspnea on exertion. She had just driven over 100 miles to a Thanksgiving celebration. Her history included hypertension, hyperlipidemia and deep venous thrombosis one year ago status post inferior vena cava (IVC) filter placement. Her medications were metoprolol and warfarin, and her international normalized ratio (INR) was 2.8. She did not use

tobacco, alcohol or illicit drugs, and her family history was unremarkable. Review of systems was positive for cough, shortness of breath, and swelling. She had no chest pain or orthopnea. Physical exam was notable for tachycardia, tachypnea, jugular venous distension, systolic murmur and 2+ bilateral lower extremity edema. She was normotensive with clear breath sounds and extremities were warm and well-perfused. CT scan showed a main pulmonary artery defect, flattening of the interventricular septum suggestive of elevated right-sided pressures, and scattered bilateral lung nodules. Echocardiogram confirmed signs of right heart failure. She was diagnosed with a massive pulmonary embolism (PE) and received emergent systemic tissue plasminogen activator. She had no significant response, so she underwent catheter-directed lytic therapy and aspiration thrombectomy, which provided minimal improvement in the size of her pulmonary artery mass. After a 2-week hospital stay, she reported feeling back to normal and was anxious for discharge. She was discharged on enoxaparin with follow-up. Biopsy of lung nodules was deferred given the need for anticoagulation. Ten days later, she was admitted from clinic due to progressive dyspnea. Physical exam was unchanged and consistent with volume overload. On echocardiogram, the pulmonary artery defect was larger and extending into her right and left pulmonary artery, and her right ventricular function had worsened. She was started on a continuous heparin infusion. CT surgery was consulted for possible thrombectomy, and hematology was consulted to evaluate for hypercoagulability. At this time, alternative diagnoses were entertained. A PET scan was ordered, which showed hypermetabolic activity within the pulmonary artery and lung nodules. CT-guided biopsy of a lung nodule was performed, and pathology was consistent with a pulmonary artery sarcoma (PAS). She was treated with doxorubicin, but she became progressively symptomatic with worsening performance status. After discussion with the patient and family, she was transitioned to hospice care and passed away.

DISCUSSION: This case illustrates the diagnostic challenge of PAS. PAS is a malignant tumor predominantly arising from the intima of the vessel, leading to progressive intraluminal growth of the tumor, right ventricular outflow tract obstruction and right ventricular failure. The differential diagnosis for a pulmonary artery filling defect includes PE, PAS, tumor embolism, locally invasive or compressive lung or mediastinal tumor, fibrosing mediastinitis and pulmonary infections. PAS are extremely rare and less than 250 cases have been reported. They are often misdiagnosed as PE, leading to a delay in diagnosis and unnecessary anticoagulation. PAS presents similarly to PE but can be distinguished by the presence of a systolic murmur which represents the outflow tract obstruction. PAS and PE also have similar appearances on CT and can only be distinguished with PET scan or gadolinium-enhanced MRI. Biopsy is often difficult due to the risk of hemorrhage. Limited data exists to the optimal treatment of PAS; thus, treatment is usually multimodal and includes radiation, chemotherapy or surgical excision, depending on the size of tumor, presence of metastases, and patient hemodynamics. Early recognition of this rare and aggressive malignancy has the potential to improve survival. Surgical excision can be curative if discovered before metastasis. Prognosis is poor with a mean survival of 1.5 months without excision, which only extends to a few years if excised. While PE is a highly prevalent condition, the key clinical features in this case that should prompt the consideration of an alternative diagnosis include: symptoms in the presence of a therapeutic INR and IVC filter, lack of response to thrombolytics and embolectomy; the presence of a systolic murmur and pulmonary nodules, and the enlargement of the pulmonary artery defect.

PULMONARY HYPOPLASIA IN ADULTS SRINATH YADLAPALLI¹; Mohammed Al-Deen¹; Kishore Yalamanchili¹; Mashrafi Ahmed². ¹TEXAS TECH UNIVERSITY-AMARILLO, Amarillo, TX; ²Texas Tech University, Amarillo, TX. (Tracking ID #2197852)

LEARNING OBJECTIVE #1: Distinguish pulmonary hypoplasia from other common causes of shortness of breath in adults.

LEARNING OBJECTIVE #2: Diagnose COPD by using objective evidence.

CASE: A 49 year old female presented with acute worsening of her shortness of breath. She had to be intubated by emergency medical service because of low oxygen saturation. She had a past medical history of diabetes mellitus type-2, hypertension, obesity, systolic heart failure, obstructive sleep apnea and COPD. She had never smoked and had no family history of emphysema. She was born full term but very low body weight. She used albuterol, budesonide and formoterol inhalers and regular oxygen two liters via nasal cannula throughout the day and CPAP at night. On physical examination, she had decreased breath sounds bilaterally, no wheezes, crackles, jugular venous distension or pedal edema. She was extubated after 24 h. She had orthodeoxia with oxygen saturations 96 % on supine position and 88 % on standing. Her oxygen saturation with and without oxygen were 96 and 84 %. Arterial blood gas showed Ph-7.25/PCO2-84/PO2-83/HCO3-37. CT-scan showed very small lungs with no emphysematous changes. COPD was ruled out as pulmonary function tests showed restrictive picture (FEV1/FVC 108 %, FEV1 29 %, FVC 27 %, DLCO 51 %, TLC 71 %). CHF exacerbation was ruled out as there was no jugular venous distension or crackles on examination. Chest x ray did not show any

pulmonary edema. Orthodeoxia could be due to intra-cardiac or intra-pulmonary shunts. CT-Angio which was done for A-V malformations was negative and 2D-Echocardiogram did not reveal any septal defects. Neuro-muscular causes were ruled out as she did not have any weakness in her extremities and negative inspiratory force was normal. The probable cause of her symptoms is congenitally hypo-plastic lungs. CT-scan showed small sized lungs with small lung cavities.

DISCUSSION: Pulmonary hypoplasia, often associated with other congenital anomalies is usually diagnosed during infancy. The incidence of congenital hypoplasia may range from 9 to 11 per 10,000 live births. Less severe cases of hypoplasia can present in adults. There have been very few case reports of pulmonary hypoplasia diagnosed in adults. It is important that we distinguish it from other common causes of shortness of breath. The patient had shortness of breath for many years. She was incorrectly diagnosed with COPD without pulmonary function tests. She did not smoke and had no family history of emphysema. The CT-scan did not show any emphysematous changes, which makes COPD or α_1 -anti-trypsin deficiency less likely. Moreover, pulmonary function tests showed restrictive picture. The treatment of COPD is beta agonists, oxygen, steroids which are different from the treatment of pulmonary hypoplasia. Diagnosing pulmonary hypoplasia earlier in life could have avoided unnecessary inhalers, steroids and early referral for lung transplant. This emphasizes the importance of diagnosing COPD using objective evidence on clinical suspicion. Lung transplant is considered as a treatment option for this condition.

PULMONARY NODULE—HOW OLD SHOULD YOUR PATIENT BE FOR YOU TO CONSIDER LUNG CANCER? Dipti Baral¹; Birendra Sah¹; Bishma Pokhrel². ¹SUNY Upstate Medical University, Syracuse, NY; ²National Academy of Medical Sciences, Kathmandu, Nepal. (Tracking ID #2199114)

LEARNING OBJECTIVE #1: Suspect lung cancer even in younger age patients with lung nodule

LEARNING OBJECTIVE #2: Recognize the importance of follow up in lung nodules

CASE: A healthy, 26 year-old-male, immigrant from South America, with no recent travel history, tested positive on tuberculin skin test during his pre-employment check-up. He reported being negative a year ago. He had smoked half pack a day for a year. There was no family history of cancer. Chest X-ray showed a right lung nodule. Acid fast bacillus smear and culture of sputum, quantiferon tuberculosis test and fungal serology came negative. Computed tomography of chest revealed an 11 mm spiculated nodule in the superior segment of right lower lobe with mild hypermetabolic activity on Positron Emission Tomography (PET) scan. Navigational bronchoscopy guided transbronchial biopsy of the nodule showed respiratory bronchiolitis. He was empirically treated with a course of antibiotics. As the nodule persisted on repeat CT scan after 2 months, CT guided needle biopsy was performed which revealed adenocarcinoma of lung. Immunohistochemical studies showed expression of CDX-2, cytokeratin 7, 19 and 20 with no expression of thyroid transcription factor-1 or napsin, which is unusual for lung adenocarcinoma. Epidermal growth factor receptor gene deletion or point mutation and anaplastic lymphoma kinase gene rearrangement were negative. He underwent right middle and lower lobe lobectomy; final diagnosis was moderately differentiated adenocarcinoma stage IA (T1aN0M0). Patient is in clinical and radiological remission at 3 months follow up.

DISCUSSION: For any incidentally found lung nodule, risk factors for cancer are evaluated; increasing patient age being one. As lung cancer is rare in younger than 30 years, diagnosis can be delayed. Lung cancer, the leading cause of cancer mortality in industrialized countries, commonly occurs in the 6th decade and with significant smoking history. But lung carcinoma should be included in differential diagnosis of any incidentally discovered lung nodules even in younger population. Adenocarcinoma is the most frequent lung cancer in this population and has been found to be more common in female and in non-smokers; hence suggesting increased genetic role. Recent researches have shown favorable outcome with surgery in young due to less co-morbidities, especially in earlier stages. Extensive researches are however needed to investigate the risk factors, genetics, prognosis and treatment options for lung cancer in this population. It is imperative that lung nodules be followed up regardless of patient's age.

PURE SENSORY VARIANT OF GUILLAIN BARRE SYNDROME WITH NORMAL REFLEXES—A VERY RARE PHENOMENON Sourabh Aggarwal²; Devin B. Malik²; Akshay Amaraneni²; Andrew Whipple¹; yashwant Agrawal². ¹Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI; ²Western Michigan University School of Medicine, Kalamazoo, MI. (Tracking ID #2197584)

LEARNING OBJECTIVE #1: GB is characterized by acute, progressive, muscle weakness.

LEARNING OBJECTIVE #2: GBS can rarely present in pure sensory form. GBS can present with normal reflexes.

CASE: Guillain Barre syndrome (GBS) is a peripheral neuropathy characterized by acute, progressive, muscle weakness and is the most important cause of acute flaccid paralysis in the United States. One of the hallmark of diagnosis is areflexia. We present an interesting and very rare variant of GBS. A 60 year old gentleman with known medical history of hyperlipidemia presented to ED with acute onset of bilateral lower extremity sensory loss mainly in his feet. It was progressive in nature, started in left leg and over next 5–6 h progressed to his right leg and was unable to walk not because of weakness, but because of loss of sensations. Sensory loss later progressed to his perianal area including his penis. He denied any other complains. There was no history of any fever, chills, sick contacts, trauma or falls. He denied any breathing difficulties, diarrhea and incontinence. His past medical history, surgical history, social and family history were otherwise unremarkable. On examination vitals were unremarkable. On neuro exam, he had a complete loss of vibratory sense, sense of position, hot and cold perception, and perception in space in his feet and bilateral legs. Muscle strength was 5/5 in both upper and lower extremities, flexors and extensors group of muscles. All deep tendon reflexes, even contralateral reflexes were normal and Babinski's sign were down-going bilaterally. Initial lab evaluation including complete metabolic profile was unremarkable. MRI of the back was done without contrast and was unremarkable. Lumbar puncture was done in the ER and showed no white cells or red cells but elevated protein. Provisional diagnosis of acute ascending sensory polyneuropathy was made and EMG was done which confirmed the diagnosis of atypical sensory variant of Guillain Barre syndrome. He was started on IVIG therapy and recovered with next 5 days to his baseline activity with resolution of sensory symptoms.

DISCUSSION: Guillain Barre syndrome is most common cause of acute flaccid paralysis in US. Sensory variant of GBS is a very rare variant. Areflexia used to be hallmark of GBS, but recent studies have pointed towards GBS variants with normal reflexes. Our patient was unique to have two atypical features of GBS. He recovered well with IVIG therapy and has not had a recurrence of symptoms till date. Physicians should have high index of suspicion for diagnosis of sensory variant of GBS in appropriate setting as early diagnosis can help prevent complications.

PUSTULE PUZZLE: A PUSTULAR RASH WITH SYSTEMIC SYMPTOMS Margaret Lowenstein¹; Ivy Nguyen¹; Priyanka Agarwal². ¹University of California San Francisco, San Francisco, CA; ²University of California, San Francisco, San Francisco, CA. (Tracking ID #2194249)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of acute generalized exanthematous pustulosis (AGEP), a rare drug eruption.

LEARNING OBJECTIVE #2: Distinguish AGEP and acute generalized pustular psoriasis.

CASE: A 93-year-old woman with a history of diabetes presented with 3 days of a full body rash. The patient had been started on ceftriaxone 3 weeks prior after being diagnosed with Klebsiella osteomyelitis of the tibia secondary to a non-healing ulcer. She reported the development of a milder rash 2 weeks prior, shortly after starting ceftriaxone, and was treated with 5 days of prednisone. The rash resolved with steroid treatment but then recurred, worsening over several days along with associated somnolence and generalized weakness. On admission, she had a temperature of 100.2, heart rate of 129, blood pressure of 102/57, with normal respirations and oxygen saturation. The patient was uncomfortable with a diffuse rash covering 60–70 % of her body surface area. The rash manifested as broad areas of erythema and pink plaques studded with innumerable pustules, some of which coalesced and ruptured leading to desquamation. She had no bullous or necrotic lesions and no mucosal involvement. White blood cells were 18 g/dl with a neutrophilic predominance and a normal eosinophil count. BUN was 115 mg/dL, creatinine was 1.2 mg/dL, and glucose was 230 mg/dL; other electrolytes and liver function tests were within normal limits. Infectious workup was negative. On skin biopsy, the patient was found to have subcorneal pustular dermatitis, consistent with acute generalized exanthematous pustulosis (AGEP) or pustular psoriasis. Her symptoms resolved rapidly with discontinuation of ceftriaxone, more consistent with a diagnosis of AGEP, as pustular psoriasis would not resolve quickly in the absence of immunomodulatory treatment. The patient was discharged with an aggressive skin care regimen. Beta lactams were added as a severe drug allergy.

DISCUSSION: Drug eruptions are an issue commonly encountered by internists, with many commonly prescribed drugs as culprits. Reactions range from a simple morbilliform rash to life-threatening reactions with systemic manifestations that can mimic septic shock. The presence of a diffuse pustular rash with systemic symptoms should point towards two important diagnoses: acute generalized exanthematous pustulosis (AGEP) and acute generalized pustular psoriasis. AGEP is a rare, acute drug eruption with a characteristic appearance of diffuse sterile pustules on a background of erythema and edema. Systemic manifestations, including fever, are usually present, and patients can develop a systemic inflammatory response leading to hypotension and shock. Lab abnormalities include a

neutrophil-predominant leukocytosis. Common precipitants include antibiotics (particularly penicillins, quinolones, sulfonamides), anti-malarials, and calcium channel blockers (particularly diltiazem), though a wide variety of drugs have been implicated. Onset is within hours to days of exposure. Treatment involves identifying and withdrawing the culprit agent, as well as supportive care with topical steroids and emollients as patients may desquamate later in their course. Patients often require admission for fluid resuscitation, infection rule-out, and intensive skin care. Pustular psoriasis is also associated with a generalized eruption of pustules and erythematous plaques, and can have systemic symptoms of fever and malaise. Lab abnormalities commonly include a leukocytosis and elevated sedimentation rate, as well as electrolyte abnormalities and elevated liver enzymes. Notably, pustular psoriasis may present in patients without a prior diagnosis of psoriasis. First line treatment for pustular psoriasis is retinoids or methotrexate, with other immunomodulatory agents such as cyclosporine or infliximab used in severe cases. AGEF and pustular psoriasis appear similar both clinically and histologically, and a thorough medication exposure history is essential to differentiating these two entities. AGEF is generally secondary to new medications as above, while pustular psoriasis flares are usually associated with withdrawal of systemic glucocorticoids (although other medications or infections have been implicated). For this reason, providers should be cautious about treating patients with known psoriasis with systemic steroids unless absolutely necessary. Although rare, both AGEF and pustular psoriasis are life-threatening rashes related to a number of commonly prescribed medications. Swift recognition and dermatologic consultation are essential to prevent serious complications.

PYOGENIC LIVER ABSCESS IN A SPLENECTOMIZED DIABETIC: A CASE STUDY Anupam Kotwal; Candace Shanks; Kevin Abraham; Maria M. Garcia. University of Massachusetts Medical School, Worcester, MA. (*Tracking ID #2190979*)

LEARNING OBJECTIVE #1: Recognize the risk factors and clinical features of a pyogenic liver abscess (PLA).

LEARNING OBJECTIVE #2: Understand the management of a PLA caused by resistant organisms.

CASE: A 75 year old lady was admitted for intermittent fevers of 1 week duration associated with chills, rigors, fatigue and myalgia. She did not report abdominal pain, dysuria, rash, vomiting or diarrhea. Her medical history was significant for Whipple's procedure (pancreatectomy, splenectomy, cholecystectomy and pylorus-sparing duodenectomy) for Intraductal Papillary Mucinous Neoplasm (IPMN) 10 years ago, type 1 diabetes mellitus, mitral regurgitation, atrial fibrillation and diverticulosis. On presentation, she was febrile at 38.6 °C and had tachycardia, conjunctival icterus, jaundice and a grade 3/6 holosystolic murmur at the cardiac apex, but no ascites, abdominal tenderness, lymphadenopathy or hepatomegaly. Laboratory workup was significant for low Hemoglobin of 11.7 mg/dL, elevated WBC of 37,200/mm³ (94% neutrophils), low albumin of 2.8 g/dL (3.5–4.8), high AST of 220 IU/L (10–40), high ALT of 125 IU/L (10–40), high total bilirubin of 17 mg/dL (0.3–1.2), direct bilirubin of 5.6 mg/dL (0.0–0.4) and high alkaline phosphatase (ALP) of 354 IU/L (30–115). The neutrophilic leukocytosis and hepato-cellular pattern of jaundice suggested an infectious hepatic process. Blood cultures were drawn and CT scan of the abdomen was performed which revealed a fluid and gas containing 6×6 cm collection in the right hepatic lobe. This was concerning for a PLA, so empiric coverage with Piperacillin/Tazobactam was initiated. Ultrasound guided drainage of the abscess was performed after which a pigtail catheter was inserted. A transthoracic echocardiogram showed moderate mitral regurgitation but no vegetations. Initial blood cultures resulted positive for *Klebsiella pneumoniae* (KP), *E. coli* and *Clostridium perfringens* (CP), following which antibiotic regimen was changed to Ampicillin/Sulbactam. Cultures of the drainage from the PLA grew *Enterococcus fecalis*, *Streptococcus bovis* and *E. coli*. Stool and urine culture remained negative. Her WBC slowly decreased to 13,400 / mm³, and liver enzymes and bilirubin normalized. Repeat blood cultures remained negative for 5 days. She was then transitioned to oral Amoxicillin/Clavulanate and remained afebrile without any chills or rigors. A week later, she again developed fever, leukocytosis and elevated ALP. Appearance of the abscess on CT scan changed to multiloculated which was further confirmed by MRCP representing a complicated abscess with a hemorrhagic component, along with mild intrahepatic biliary duct dilatation. A percutaneous biliary drain was placed, and Piperacillin/Tazobactam and Clindamycin were initiated. Blood cultures this time resulted positive for extended-spectrum beta-lactamase (ESBL) producing KP, so the antibiotic regimen was changed to Ertapenem. We checked tumor markers, of which CA 19–9, CA 125 and Carcinoembryonic antigen were mildly elevated, and Alpha-fetoprotein was normal. She was also found to have a right sided pleural effusion, which was exudative without features of complicated effusion. The culture and cytology analyses were negative. She underwent a biopsy of the liver parenchyma surrounding the PLA which demonstrated histological features of inflammation but not malignancy. The abscess fluid was also negative for malignant cells. Blood cultures drawn 2 days and 7 days later did not grow any organisms. Within 2 weeks, her laboratory abnormalities normalized, she remained afebrile and jaundice resolved. She was discharged

from the hospital on Ertapenem for a proposed duration of 4 weeks and a plan to remove the pigtail catheter and biliary drain at a later date.

DISCUSSION: PLA is the most common type of visceral abscess, and is caused mainly by enteric bacteria. Our patient's history of poorly controlled diabetes, IPMN and abdominal surgery were potential risk factors. Splenectomy increased her susceptibility to encapsulated organisms like KP and diabetes increased her susceptibility to CP. The absence of abdominal pain or tenderness and the different organisms growing from the PLA versus the blood were unusual features in this case. Management of PLA incorporates antibiotic therapy and abscess drainage. Percutaneous drainage has been shown to be effective for single as well as multiloculated abscesses, with surgical drainage being used as a last resort. Studies have evaluated the correlation between PLA and visceral malignancies. In particular, PLA due to KP is correlated with increased incidence of colorectal malignancy. Our patient's KP bacteremia suggests hematogenous spread from her abscess. In the absence of histological evidence of malignancy, the elevation of tumor markers was attributed to an inflammatory state caused by the PLA which would also explain the exudative pleural effusion.

PYOGENIC LIVER ABSCESS PRESENTING WITH A MIGRATORY RASH Timothy C. Beer¹; Michael Foltzer². ¹Geisinger Medical Center, Danville, PA; ²Geisinger Medical System, Danville, PA. (*Tracking ID #2153897*)

LEARNING OBJECTIVE #1: Learn the appropriate management strategies for pyogenic liver abscess based on size and clinical characteristics

LEARNING OBJECTIVE #2: Recognize referred shoulder pain as a sign of intra-abdominal pathology

CASE: A previously healthy 27-year-old man presented to the ED for evaluation of two days of fevers, right shoulder pain and a migratory erythematous rash on his chest. He worked in a meat-processing plant, was sexually active and monogamous with his fiancé and denied recent shoulder injury, tick bites or travel. He had undergone a tooth extraction 5 months prior. In the ED, exam revealed a temperature of 101.5 °F, heart rate of 122 and right shoulder tenderness exacerbated by active movement and reclining. A non-tender, erythematous rash extended in a band from shoulder-to-shoulder across his chest. He had widespread tooth decay, but no sign of acute oral infection. The remainder of his exam was unremarkable. Laboratory results were remarkable for a leukocytosis of 14,300 and ESR of 51 mm per hour. The remainder of his labs, including renal function tests, serum electrolytes, liver function tests, hepatitis panel, ANA, RF, EBV and Lyme serologies were all normal. Radiographs of the right shoulder were unremarkable. Blood and urine cultures were drawn, antibiotic therapy with Ertapenem was initiated, and he was admitted to the hospital. Within 3 h of admission, the patient had defervesced, his shoulder pain had resolved and his rash had completely disappeared. CT and MRI of the abdomen and pelvis revealed a 6.1×5.7×5.5-cm multiseptated lesion within the hepatic dome, concerning for liver abscess. (2 figures) The location of his liver abscess was felt to be poorly amenable to percutaneous drainage. Since his symptoms seemed to have improved dramatically with antibiotics alone, the decision was made to manage him non-invasively unless his status worsened. He remained clinically stable for the next several days, however, on the fourth day of hospitalization, he became febrile to 104.5 °F and both his rash and right shoulder pain returned. Within a span of several hours, a rash appeared near his right shoulder, migrated across his chest to his left shoulder, disappeared altogether, and then reappeared once again. (3 figures) Shortly thereafter, he developed right upper quadrant abdominal pain. His clinical condition continued to deteriorate rapidly and emergent surgical drainage of the abscess was performed. Cultures of his purulent liver abscess drainage grew many *Fusobacterium* species. Antibiotics were continued for 2 weeks postoperatively. At follow-up 1 month after discharge, he denied any recurrence of fever, rash or shoulder pain and repeat imaging revealed near complete resolution of his liver abscess.

DISCUSSION: This case provides multiple interesting clinical features and prompts several useful teaching points. It appears to be the first published report of pyogenic liver abscess presenting with a migratory rash. When considered in isolation, such an unusual clinical phenomenon could potentially send a clinician on a wild goose chase for various exotic infectious, rheumatologic and neoplastic etiologies. However, the additional physical exam finding of right shoulder pain in the absence of trauma subtly but importantly pointed toward an intra-abdominal pathology. Pain signals from abdominal viscera, especially the liver and gallbladder, are often referred to the right shoulder via the phrenic nerve. Such referred pain is particularly common when there is irritation of the diaphragm, such as in this case, where the abscess was located in the hepatic dome. Our patient was a healthy 27-year-old without any history of underlying hepatobiliary pathology, diabetes, cancer, immunosuppression or any of the other major risk factors classically associated with pyogenic liver abscess. However, a likely source of infection could be identified upon careful consideration of his reported history in light of the organism isolated from his liver abscess. *Fusobacterium* is commonly implicated in infections involving periodontal tissues and our patient had poor dentition and had undergone dental extraction just several months prior to his presentation. This case therefore highlights that, in the absence of

known hepatobiliary pathology or immunosuppressing condition, a thorough dental history and examination may help identify the underlying source of pyogenic liver abscess. Finally, this case reinforces the general expert consensus that successful definitive treatment of large pyogenic liver abscesses essentially always requires percutaneous or surgical drainage. Several large retrospective reviews have demonstrated high failures rates with medical therapy alone for pyogenic abscesses above 5-cm in greatest dimension. Clinicians should therefore not wait for clinical deterioration to develop before taking these patients for either percutaneous or surgical drainage.

RADIATION RECALL: A RARE CASE OF ORAL MUCOSITIS AFTER PEMETREXED CHEMOTHERAPY Mashooque Dahar; Justin Vranic; Venu M. Ganipiseti; Venu Pararath Gopalakrishnan; Ubaid Sherwani. Presence Saint Francis Hospital, Evanston, IL. (Tracking ID #2198449)

LEARNING OBJECTIVE #1: Recognize a rare complication of mucositis after chemotherapy in a patient who had radiation of the involved area in remote past.

CASE: An 82 year-old Caucasian male was admitted to our hospital with severe odynophagia, hoarseness of voice and poor oral intake for 2 days. He denied fevers, chills, cough, shortness of breath, orthopnea, diarrhea, nausea, vomiting or skin rash. The patient was recently diagnosed with stage IVA poorly differentiated adenocarcinoma of the lung with bilateral lung nodules and malignant pleural effusions. He received his first cycle of chemotherapy with Pemetrexed (after appropriate premedications) and carboplatin 3 days prior to admission. The patient's past medical history was significant for squamous cell carcinoma of left tonsil that was treated in 2001 with targeted radiotherapy and stage III CKD. He had a 30 pack-year smoking history but quit 30 years ago. On physical examination he was hemodynamically stable. He had severe swelling and erythema of the oral mucosa overlying his left tonsillar fossa in the area that was previously irradiated. No thrush or lymph node enlargement was noted. His labs showed mild leukocytosis of 11,000 k/mm cu and mild elevation of BUN to 51 mg/dL and Cr to 1.85 mg/dL from his baseline likely due to poor oral intake and dehydration. His CT scan of soft tissues of the neck was unremarkable. Upper GI endoscopy (EGD) showed nothing significant except severe oral mucositis of the prior irradiated area. He was treated conservatively with local Lidocaine lozenges and short course of systemic corticosteroids. His condition improved gradually and future cycles of Pemetrexed were avoided.

DISCUSSION: Radiation recall is a rare and unpredictable phenomenon that is characterized by an acute inflammatory reaction confined to previously irradiated tissues. It is posited that following radiotherapy, molecular and microvascular changes occur within the irradiated tissue bed, leaving it unable to tolerate cytotoxic medications. When systemic cytotoxic therapies are administered, localized inflammation results in a dermatitis-like reaction. Anticancer agents are most likely to precipitate radiation recall, but it is also believed that certain antibiotics, antituberculosis drugs, and statins can also lead to this phenomenon. The median interval between radiotherapy completion and clinical presentation of radiation recall is approximately 40 days; however, there are case reports of radiation recall occurring years after the completion of radiotherapy. Skin reactions comprise approximately two-thirds of radiation recall cases, but in rare cases soft tissue necrosis, mucositis, and solid organ involvement have also been reported. Pemetrexed is a multi-targeted, anti-folate drug approved as a single agent or in combination with cisplatin for the treatment of a small number of malignancies, including metastatic non-small cell lung cancer and malignant pleural mesothelioma. Although it has been associated with skin toxicity, there is a paucity of cases demonstrating radiation recall dermatitis in the published literature. Here, we report the first case of severe radiation recall mucositis following Pemetrexed chemotherapy exposure. The patient in this case received radiotherapy to his left tonsil 14 years prior to his first exposure to Pemetrexed. This was an especially early presentation for mucositis 2 days following administration of Pemetrexed as compared to the typical onset of mucositis as side effect chemotherapeutic agents. We suspect radiation therapy predisposed the patient to premature onset of severe mucositis of previously irradiated area. This clinical case demonstrates that Pemetrexed can trigger severe radiation recall mucositis in select patients. Additionally, this highlights a rare complication that can occur years after the successful completion of radiation therapy. Clinicians must be cognizant of this possible side effect when caring for patients with prior radiation exposure, and they need to be vigilant for signs of localized dermatitis, mucositis, and soft-tissue necrosis in patients who were recently started on chemotherapeutics or antibiotics after the completion of radiotherapy.

RAPIDLY PROGRESSIVE FATAL GAS GANGRENE DUE TO CLOSTRIDIUM SEPTICUM IN A PATIENT WITH COLON CANCER REVEALED BY AUTOPSY Haruka Kuno¹; Harumi Gomi²; Kazutaka Fukushima²; Yukiko Matsumoto²; Taijiro Shirokawa²; Kousei Miura³; Shijima Taguchi³; Norio Takayashiki³; Takao Kanai². ¹University of Tsukuba Hospital, Tsukuba, Japan; ²Mito Kyodo General Hospital, University of Tsukuba, Mito, Japan; ³Mito Kyodo General Hospital, Mito, Japan. (Tracking ID #2181014)

LEARNING OBJECTIVE #1: To promote awareness of patients with gas gangrene due to *Clostridium septicum*

LEARNING OBJECTIVE #2: To diagnose and treat patients with gas gangrene by early recognition and aggressive debridement

CASE: A 73 year-old man with well controlled type II diabetes mellitus and hypertension presented to our hospital with a 2-day history of left upper arm pain and 4-h history of left lower back pain. He had no history of trauma or surgery. On admission, he was afebrile and vital signs were unremarkable except for respiratory rate of 26 per minute. The left lower back showed severe pain, wide range of discoloration, and palpable gas under the skin. There was no tenderness or warmth. X-ray of the trunk showed extensive gas in the soft tissues of the left lateral thoracic dorsal region extending to the pelvis. A diagnosis of necrotizing soft tissue infection was made and treatment was started with intravenous fluids and antibiotics. The patient deteriorated rapidly, and within 7 h he demonstrated signs of severe sepsis and septic shock with systolic blood pressure of 60 mmHg and a pulse rate of 110 beats per minute. The patient was taken immediately to the operating room for urgent surgical debridement. Initial incisions revealed extensive myonecrosis with gas formation in the soft tissues and liquefied muscles. Gram stain of the necrotic tissues revealed an abundance of spore-forming gram-positive bacilli. After the operation the patient was admitted to the intensive care unit for treatment of multi organ dysfunction. Wide-spectrum antibiotics including meropenem, vancomycin, and clindamycin were urgently administered together with crystalloid rehydration. The patient died of overwhelming sepsis 6 days later despite rigorous and intensive medical therapy. The infecting organism was isolated but not identified by routine methods of tissue samples and blood cultures. Genetic sequence analysis identified the organism as *Clostridium septicum*. Then the final diagnosis of Clostridial myonecrosis, i.e. gas gangrene was made. An autopsy discovered ascending colon cancer in the patient which had not been noted before.

DISCUSSION: Gas gangrene is a rare, life-threatening infection of deep skin and soft tissues. It is typically associated with contaminated wounds but may also occur in the absence of any trauma or surgery. Non-traumatic gas gangrene due to *Clostridium* spp. is most commonly caused by *Clostridium septicum* [1]. *C. septicum* is part of normal gastrointestinal tract flora but when infection occurs, it is often fatal. *C. septicum* is capable of infecting normal tissue and thought to gain access to the bloodstream through the gastrointestinal mucosa. It is critically important that this highly fatal condition is considered early. A comprehensive approach using a careful history-taking and physical examinations along with microscopic analysis such as Gram stain of the tissues can confirm the diagnosis and associated complications [2]. Treatments should include aggressive surgical debridement and appropriate combination antibiotics, as well as general supportive medical care. A multidisciplinary team approach is necessary to manage these patients pre- and post-operatively. In conclusion, we report a case of traumatic gas gangrene due to *C. septicum* with colon cancer revealed by autopsy. It is important that primary care providers maintaining recognition of gas gangrene provide prompt and appropriate management for patients with skin and soft tissue infections in order to improve their clinical outcomes. 1. Dylewski J, Drummond R, Rowen J. A case of *Clostridium septicum* spontaneous gas gangrene. CJEM 2007;9:133-5. 2. Wright WF. *Clostridium septicum* myonecrosis presenting as an acute painful foot. Am J Emerg Med 2012;30(1):253.e3-5

RARE CASE OF RENAL CELL CARCINOMA METASTASIS 15 YEARS AFTER RESECTION TO PAROTID GLAND AND EXTERNAL JUGULAR VEIN Karthik Kannegolla¹; Rakshita Chandrashekar¹; Abhishek Seth¹; Juraj zahatansky¹; sree chandana². ¹Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI; ²west michigan cancer centre, Kalamazoo, MI. (Tracking ID #2199699)

LEARNING OBJECTIVE #1: There have been case reports of unusual sites of metastasis of RCC to main pancreatic duct, biliary thrombus, superior sagittal sinus. However, unusual metastatic sites like head and neck region with late metachronous metastases (>10 years) are extremely rare. Hence metastasis from RCC must always be in the differential for any vascular presentation in a patient with a history of RCC.

CASE: Eighty-three year old Caucasian man with past medical history of hypertension, hyperlipidemia, left RCC 15 years back status post left nephrectomy presented with a 2 cm×2 cm painless left parotid swelling which gradually progressed over 4 months. Ultrasound revealed tumor thrombus in the left external jugular vein with extension in to other branches. CT soft tissue of neck revealed asymmetric contrast enhancement in the left masticator, retromandibular and external jugular vein. Fine needle aspiration cytology was consistent with metastatic RCC. He underwent partial left parotidectomy and excision of left external jugular vein with dissection of cranial nerve VII. Gross Pathology showed the 2.2×1.0×1.0 cm mass extending into the lumen of the vein. Given his age and extent of tumor, he was treated also with radiation therapy. He was started on Pazopanib and switched to VOTRIENT. Patient is being followed at the cancer center regularly and has been doing well for 2 years.

DISCUSSION: Renal cell carcinoma(RCC) is the most common primary neoplasm of the kidney. Common metastasis sites include lungs, liver and brain. Late metastasis 10 years after the curative nephrectomy is very rare. Vascular invasion into the external jugular vein is also very rare with less than 20 cases reported in literature. Renal cell carcinoma, especially clear cell, gains access to the venous system as the initial route of extrarenal spread. Intravenous growth can involve extrarenal veins or renal veins but it is extremely rare to metastasize and involve the head and neck veins. Considering the fact that kidneys receive 25 % of circulating blood volume, they are hypervascular tumours associated with multiple arteriovenous shunt, with a high expression of vascular endothelial growth factor(VEGF), the platelet-derived growth factor receptor and basic fibroblast growth factor(bFGF), good adaptive potential in a diverse array of microenvironments, RCC has a high hematogenous spreading potential. However, an alternative theory postulates that tumor emboli may spread through Batson's paraspinal venous plexus, bypassing pulmonary vascular filtration and reaching head and neck. There have been case reports of unusual sites of metastasis of RCC to main pancreatic duct, biliary thrombus, superior sagittal sinus. However, unusual metastatic sites like head and neck region with late metachronous metastases (>10 years) are extremely rare. Hence metastasis from RCC must always be in the differential for any vascular presentation in a patient with a history of RCC.

RECURRENT BENIGN LYMPHOCYTIC MENINGITIS- A CASE REPORT
Mayssam A. Nehme; Karolyn Teufel. George Washington University, Arlington, VA.
(Tracking ID #2159104)

LEARNING OBJECTIVE #1: Recognize benign recurrent lymphocytic meningitis

LEARNING OBJECTIVE #2: Prevent prolonged hospitalizations, unnecessary testing and treatment with associated costs.

CASE: A 33-year-old woman presented to the emergency department with headache, meningismus, subjective fever and vomiting of 3 days duration. She was overall healthy except for two previous hospitalizations for viral meningitis in 2006 and 2011, and possible bacterial meningitis in 2002. At the time of presentation, she denied any recent infections or sick contacts. She also denied any new neurologic symptoms including hallucinations, diplopia, photophobia, seizure activity or focal deficits. The patient recently traveled to Europe for business, but was not exposed to unpasteurized products, ticks or mosquito bites. She was in a monogamous relationship and did not have any history of genital or oral herpetic lesions. The physical exam revealed positive meningeal signs and was otherwise unremarkable. The patient was admitted to the hospital and a lumbar puncture revealed lymphocytic pleocytosis with CSF WBC 164, lymphocytes 99 %, glucose 55, total protein 90, RBC 23. We treated her with intravenous Acyclovir and her symptoms improved markedly within 24 h. The following day, HSV2 PCR result was positive and the patient was diagnosed with recurrent benign lymphocytic meningitis. She was discharged on oral Valacyclovir with a plan to consider suppressive therapy at outpatient follow up with an infectious disease specialist.

DISCUSSION: Recurrent benign lymphocytic meningitis was first described by Pierre Mollaret in 1944. It is a rare disease that manifests with recurrent episodes of aseptic meningitis followed by spontaneous recovery. The disease is most commonly seen in young adults, especially women. Patients generally present with acute headache, meningismus, fever and photophobia. They can also exhibit focal neurologic deficits, including cranial nerve palsies, seizures, hallucinations, diplopia and altered mental status. Most cases are associated with HSV2 infection and careful assessment including sexual history should be obtained. Patients do not always have a history of genital or oral herpes infection and analysis of CSF for HSV DNA is the gold standard for diagnosis. Once confirmed, patients can be treated with Acyclovir which may also be used as suppressive therapy. Recurrent benign lymphocytic meningitis should be considered in healthy patients with repeated episodes of meningitis. Early diagnosis may prevent prolonged hospitalizations along with the iatrogenic risks of inappropriate treatment, unnecessary testing and the associated costs

RECURRENT DAPSONE HYPERSENSITIVITY SYNDROME IN AN HLA-B*13:01-POSTIVE INDIVIDUAL WITH OCCULT MYCOBACTERIUM MARINUM INFECTION David M. Levine; Matthew Akiyama; Xian Jie (Cindy) Chen; Diana Esaiian; Neha Jindal; Vinh Pham; Patrick M. Cocks. New York University School of Medicine, New York, NY. (Tracking ID #2195193)

LEARNING OBJECTIVE #1: Describe the diagnosis and management of dapsone hypersensitivity syndrome.

LEARNING OBJECTIVE #2: Formulate a differential diagnosis for nodular lymphangitis.

CASE: A 60 year-old Chinese male with history of hypertension, diabetes, dyslipidemia, and coronary artery disease initially presented 6 months prior with a right fourth finger

lesion present for several months. A biopsy showed a diffuse dermal infiltrate of neutrophils and histiocytes; special stains were negative. Six weeks prior, the patient started fluconazole and dapsone, resulting in mild improvement, but upon discontinuing (1 month of dapsone), 6 days later he noticed the onset of a rash. His face was edematous with confluent erythematous patches, while his abdomen, chest, and upper extremities contained erythematous macules coalescing into patches with scattered foci of punctate crusts. His bilateral inguinal folds and proximal thighs demonstrated purpuric and erythematous macules, respectively. His lower legs, feet, and oral mucosa were spared. The rash was accompanied by new onset cough, diarrhea, fever (39.1 C), tachycardia, and tachypnea. Initial lab work was significant for venous lactate 3.28, AST 115, ALT 213, hypokalemia, anemia (hemoglobin 10.4, MCV 90), but no eosinophilia (later noted at 10 %). His initial RegiSCAR of 5 indicated probable DRESS which trended up to 6 (definitive DRESS) after eosinophilia was noted. Infectious and rheumatologic workups were negative. Treatment was initiated with IV methylprednisolone 80 mg every 6 h for 2 days, then 40 mg every 12 h for 2 days, with defervescence and slight improvement in rash. He was subsequently discharged on PO prednisone 30 mg daily. One day later he represented with recrudescence of fever (39.8 C), venous lactate, hepatitis, and leukocytosis with eosinophilia. He again received steroids with improvement. As an outpatient, he was slowly tapered, but upon tapering to 30 mg daily (day 25), the patient noted recurrent rash at his wrists and ankles and so prednisone 40 mg daily was reinstated with subsequent improvement. Another slow taper over months was successful. Subsequent HLA typing revealed heterozygosity for the HLA-B*13:01. Approximately 4 months after discharge, due to a lack of improvement in his finger lesion, another biopsy was sent, this time to the CDC, which tested positive for *Mycobacterium marinum* by PCR. *M. marinum* was treated with clarithromycin and rifampin with good effect.

DISCUSSION: Our case illustrates a classic presentation of Dapsone Hypersensitivity Syndrome (DHS) with a previously undescribed feature: recurrent relapse and clinical deterioration in the setting of steroid taper. Rapid steroid taper associated with drug hypersensitivity relapse has previously been reported in phenytoin, vancomycin, carbamazepine, leflunomide, and allopurinol. DHS requires two of four criteria: fever, generalized rash, hepatitis, and lymphadenopathy. Other findings might include mucosal involvement, exfoliative dermatitis, adenopathy, hemolytic anemia, and cholangitis. DHS onset ranges from 6 h to 21 weeks (mean 28 days) and resolves within 7 days to several months (mean 27 days). Persons that possess the HLA-B*13:01 allele are at increased risk for DHS. The initial discharge dose of 30 mg daily was likely inadequate, yet there are few guidelines to inform this decision. Prednisone dosing recommendations range from 0.8 to 2 mg/kg/d followed by a gradual taper over 3–6 months. This case also highlights the importance of identifying the etiologic agent for nodular lymphangitis in a timely fashion so that directed antimicrobial therapy may be initiated and adverse events from empiric agents may be prevented. Common etiologies include *Sporothrix schenckii*, *Nocardia* (most often *N. brasiliensis*), *M. marinum*, leishmaniasis, tularemia, and systemic mycoses. While *M. marinum* often eludes diagnosis due to poor growth on culture media, pathologic and molecular techniques are important in establishing the diagnosis. This was one of the first cases in the 2013 outbreak in New York City. Here we present a case of DHS in an HLA-B*13:01 positive individual with recurrent relapse and clinical decline after steroid taper in the setting of occult *M. marinum* infection. It is important for practitioners to remain cognizant of steroid dosing and taper during DHS treatment. Our case demonstrates that gradual, lengthy steroid taper may be crucial in preventing recurrent DHS, although more investigation is needed. It also demonstrates the utility of directed diagnostics for nodular lymphangitis.

RECURRENT DEBILITATING COMPARTMENT SYNDROME IN ASSOCIATION WITH UNDIAGNOSED HYPOTHYROIDISM Tatvam T. Choksi²; Abha Patel²; Richard Plotzker¹; Ravindra Hallur². ¹Mercy Catholic Medical Center, Philadelphia, PA; ²Mercy Catholic Medical Center, Darby, PA. (Tracking ID #2199276)

LEARNING OBJECTIVE #1: Major osseous or vascular limb trauma, crush injury, ischemia, burns etc. are well known causes of acute compartment syndrome (ACS). However, ACS can be an extremely rare and serious manifestation of underlying thyroid disease. Our review of the literature revealed at least three cases of compartment syndrome primarily associated with hypothyroidism. Here we describe a unique case of recurrent bilateral compartment syndrome in a young man with previously undiagnosed hypothyroidism.

CASE: A 30 year old African American male with history of hypertension presented to the emergency department with increasing pain, swelling and numbness of his right leg over 1 week. Symptoms were localized to his anterior right shin down to the dorsum of his right foot. He was recently diagnosed with compartment syndrome in the same extremity 2 months prior, at which time he underwent fasciotomy at an outside institution. On further review, he described an earlier episode of compartment syndrome of his left lower extremity 7 years prior that was also treated with fasciotomy. He denied any trauma, illicit

drug use, excessive exertion or alcoholism. He did experience fatigue and mild extensor calf pain. On exam, he was afebrile with a blood pressure of 160/80 mm Hg and a HR of 104 beats per minute. Examination of his right extremity revealed a tense, tender area over the right shin and exquisite pain with passive stretch and dorsi-flexion of the foot. His dorsalis pedis pulse on right was palpable, but diminished. Duplex ultrasound was negative for deep vein thrombosis. Due to the high suspicion of compartment syndrome, a Stryker needle was introduced revealing a compartment pressure of 35 mm Hg, confirming compartment syndrome. He underwent emergent four compartment fasciotomies of the right lower extremity. Vascular work up was negative for ischemia and the etiology remained unknown. From the records, it was noted that he had persistently elevated CPK (creatine phosphokinase) levels in the past, and that they continued to remain elevated post procedure with a peak level of 1002 U/L. Therefore, a thyroid panel was sent, which showed a TSH of 33.98 uIU/mL and T_4 of 0.66 ng/DL. He was started on 100 mcg of Levothyroxine at that time and eventually had a split thickness skin graft placed over the fasciotomy site. On subsequent follow up, the TSH had normalized.

DISCUSSION: Acute compartment syndrome is a clinical emergency characterized by increased intra-compartmental pressure that can result from any condition that decreases the capacity of or increases the volume of fluid within a defined fascial envelope, resulting in self-perpetuating ischemia, edema and myo-neural injury. Despite having a typical acute onset following the inciting event, in many cases no etiology can be identified. Hypothyroidism is an unusual and highly under-recognized etiology of compartment syndrome. Hypothyroidism causes increased deposition of glycosaminoglycan (GAG), primarily hyaluronic acid, in the dermis and epidermis, as well as in skeletal and smooth muscles. Moreover, thyroid hormone deficiency stimulates fibroblast GAG synthesis and inhibits its degradation. Hyaluronic acid deposition is associated with retention of fluid and an increase in vascular permeability to large molecules. Therefore, hypothyroidism can result in muscle enlargement, increased extravasation of plasma protein in the interstitial space, and impaired compensatory lymph flow and protein return rate. All of these mechanisms can contribute to an increase in compartment volume, predisposing an individual to develop compartment syndrome. Also, patients with hypothyroidism may have underlying myopathy suggested by stiffness or non-specific muscle ache, extensor calf pain and persistently elevated CPK levels, as in our patient. After initiation of treatment with Levothyroxine, over the last 18 months our patient has not had any recurrence of compartment syndrome. Thus, we conclude that hypothyroidism can result in the development of ACS especially in those with anatomical predisposition. Association between hypothyroidism and the development of compartment syndrome, though extremely rare, should not be overlooked. One should always consider undiagnosed or inadequately treated hypothyroidism as a potential cause of ACS when other common etiologies have been ruled out and history or records are suggestive of unexplained myopathy.

RECURRENT NON-OCCLUSIVE MESENTERIC ISCHEMIA DURING DIALYSIS Anene Ukaigwe²; Oluwaseun Shogbesan²; Opeyemi Fadahunsi²; Adetokunbo Oluwasanjo²; Anthony Donato¹. ¹Reading Health System, W. Reading, PA; ²Reading Health System, West Reading, PA. (Tracking ID #2199352)

LEARNING OBJECTIVE #1: Diagnose mesenteric ischemia

LEARNING OBJECTIVE #2: Recognize dialysis as a precipitant of non-occlusive mesenteric ischemia

CASE: Sixty-nine year old man presented to the emergency room with a 2 week history of postprandial abdominal pain, leading to food fear (sitophobia) and 12 lb weight loss over 2 weeks. His past medical history was significant for coronary and femoro-popliteal artery bypass grafting with multiple stents, for coronary and peripheral artery disease; hypertension, type II diabetes mellitus and chronic kidney disease (CKD) on peritoneal dialysis. His symptoms started after his peritoneal dialysate was changed to a more concentrated solution. His medications included carvedilol and isosorbide mononitrate. Physical examination revealed positive orthostatic vital signs, BP 147/83 mmHg; HR 58/min, sitting; 125/54 mmHg, HR 76/min, standing. His abdomen was soft, non-tender without inflammation or purulent drainage from his peritoneal dialysis port. The rest of his physical examination was unremarkable. Complete blood count revealed leukocytosis of 15.1 c/mm³ with chemistries at his baseline. Lactate was 2.5 mg/dl. CT scan of the abdomen revealed small-bowel ischemia with evidence of gas within mesenteric and hepatic portal veins. CT angiography of abdomen subsequently revealed diffuse atherosclerotic disease resulting in areas of moderate stenosis within the ostium of the superior mesenteric artery as well as within the abdominal aorta. His anti-hypertensives were held, however he remained unable to eat without pain. He therefore underwent percutaneous angioplasty of his celiac and superior mesenteric arteries with complete resolution of his symptoms. He was subsequently discharged without any further episodes of mesenteric ischemia.

DISCUSSION: Non-occlusive mesenteric ischemia (NOMI) is increasingly being recognized as a potentially lethal complication of dialysis in patients with CKD. It occurs in 2 % of dialysis patients vs 0.2 % of non-dialysis patients. During dialysis, the need to remove

large amounts of fluid leads to intravascular volume depletion, relative hypovolemia and hypotension. With repeated episodes, this may lead to NOMI as occurred in our patient. The clinical features include postprandial abdominal pain, sitophobia, nausea, vomiting with weight loss, which may be followed by guarding, fever, leukocytosis, metabolic acidosis and elevated lactate levels. The abdominal pain is usually out of proportion to the abdominal examination findings. When these symptoms and signs occur in a patient with ASCVD or risk factors for ASCVD, in the setting of intravascular volume depletion, drugs that reduce splanchnic flow e.g. digoxin, epinephrine, NOMI should be suspected. The diagnosis is reportedly missed up to 90 % of cases, therefore a high index of suspicion is needed. Prompt recognition and intervention is key to initiating appropriate management to prevent morbidity and mortality.

RECURRENT PERICARDITIS NOT RESPONSIVE TO NSAID THERAPY Kathryn Wakmundzki. Penn State University, Hershey, PA. (Tracking ID #2200125)

LEARNING OBJECTIVE #1: Recognize purulent pericarditis as a possible diagnosis when standard treatment fails.

LEARNING OBJECTIVE #2: Recognize diagnostic challenges in purulent pericarditis.

CASE: A previously healthy 37-year-old African American woman with recurrent episodes of presumed viral pericarditis unresponsive to NSAIDs presented with a fourth episode of pericarditis and fevers. She had a large pericardial effusion on echocardiogram with evidence of tamponade. Pericardiocentesis yielded 300 mL of purulent fluid (26,000 nucleated cells, 96 % neutrophils, greater than 100,000 RBCs). Blood and pericardial fluid cultures were negative. She required a pericardial window due to fluid re-accumulation. Empiric piperacillin-tazobactam led to symptom resolution within 24 h of initiation. Rheumatologic workup was negative, as was Tuberculosis and HIV testing. Two separate tissue specimens obtained during her window grew *Propionibacterium*. She was treated with 4 weeks of IV ceftriaxone with complete resolution.

DISCUSSION: Purulent pericarditis carries a mortality of up to 40 % with treatment and 100 % if untreated. It is, for this reason, important to suspect purulent pericarditis in refractory pericarditis or with suspicious pericardial fluid analysis because delay of treatment can have fatal consequences. Risk factors for bacterial pericarditis include pericardial effusion, chest surgery or trauma, immunosuppression, and chronic disease. Fluid analysis poses a challenge because, unlike Light's criteria for pulmonary effusions, there are no standard criteria for exudative, transudative, or purulent pericardial effusions. Typically, pericardial fluid with neutrophil-predominant leukocytosis, low glucose, and elevated protein and lactate dehydrogenase suggests purulence. Fluid culture should be performed but is often unrevealing for a specific cause or pathogen with diagnostic yield as low as 5–35 % of the time. While *Propionibacterium* has only been documented rarely as a causative agent, it is just one of many potential pathogens that will not respond to standard therapy with NSAIDs or colchicine. The most common bacterial pathogens include *Staphylococcus aureus* (36 %), *Streptococcus pneumoniae* (21 %), and *Hemophilus influenza* (12 %). Recommendations for empiric therapy are an antistaphylococcal antibiotic plus an aminoglycoside to cover these pathogens. With high clinical suspicion, purulent pericarditis should be drained immediately and treated empirically with antibiotics due to its challenging diagnostics and high mortality.

RENAL INFARCTION SECONDARY TO SPONTANEOUS RENAL ARTERY DISSECTION: A CASE REPORT Zijing Wu¹; Zeshan Siddiqui²; Christopher Smith¹. ¹Queen's University, Kingston, ON, Canada; ²University of Limerick, Limerick, Ireland. (Tracking ID #2192835)

LEARNING OBJECTIVE #1: To recognize spontaneous renal artery dissection as an important cause of renal infarction

CASE: A 52-year-old man with a history of gout and perforated diverticulitis presented to the hospital with acute onset left flank pain that developed 3 days prior to admission. He reported radiation of the pain to the left anterior abdomen as well as subjective fevers, chills and sweats. There was no diarrhea, nausea, vomiting, hematochezia, hematuria, urinary symptoms, rashes nor any rheumatological symptoms. He was a non-smoker and had no history of hypertension, atherosclerotic disease, cardiac arrhythmias, connective tissue disease, nephrolithiasis, recent abdominal trauma or risk factors for endocarditis. Blood pressure was 136/80 mmHg with a regular pulse rate of 106 beats per minute. Tympanic temperature was normal. Heart sounds were normal without murmurs or extra heart sounds. There were no peripheral stigmata of endocarditis and a fundoscopic exam was normal. The abdomen was soft and non-tender without organomegaly. There was mild tenderness to percussion in the left costovertebral angle. An electrocardiogram showed sinus tachycardia. Abnormal laboratory results included a white blood cell count of $18.8 \times 10^9/L$, lactate dehydrogenase (LDH) of 577 U/L, C-reactive protein (CRP) of 268 mg/L and a creatinine of 102 umol/L compared to a baseline of 62 umol/L. Urinalysis was negative. A computed topography (CT) of the abdomen and pelvis was performed.

The scan was negative for renal stones and recurrent diverticulitis. However, a large cortical infarct involving the upper pole of the left kidney was seen. An echocardiogram, blood cultures, antiphospholipid antibodies, and vasculitis panel were ordered. A CT angiogram performed subsequently showed acute dissection of the superior branch of the left renal artery. Anticoagulation with low molecular weight heparin was commenced with bridging to warfarin and the patient was discharged the following day in a stable condition with a creatinine level of 97 $\mu\text{mol/L}$. Results of thromboembolic and vasculitis workup all returned negative.

DISCUSSION: Renal infarction is a rare condition that is infrequently encountered by the general internist. It is often misdiagnosed initially as it mimics many other diseases. The clinical hallmarks include acute onset abdominal and/or flank pain, often accompanied by nausea, vomiting and macroscopic hematuria. Laboratory investigations may show microscopic hematuria, elevated creatinine levels, leukocytosis, elevated CRP as well as a high LDH. The most common identifiable etiologies of renal infarction include thromboembolic events originating from the heart (atrial fibrillation and endocarditis being the most common), renal artery injury and hypercoagulable states. In approximately 30 % of patients the etiology remains unclear even after an extensive workup for the aforementioned causes. Together with underlying arterial diseases, such as fibromuscular dysplasia and Ehlers-Danlos syndrome, renal artery dissection is among the leading causes of renal infarction caused by renal artery injury. Spontaneous renal artery dissection (SRAD) is a rare entity that occurs in the absence of an extension from an aortic dissection, abdominal trauma or surgical interventions, such as percutaneous angioplasty. Similar to our patient, SRAD typically afflicts men in their fourth to sixth decade of life, who are otherwise healthy, without any clear identifiable risk factors for dissection, such as hypertension or inherited collagen tissue disease. The CT angiogram plays a pivotal role in the diagnosis of SRAD and it is part of the workup that must be considered for a patient in whom the probability of a thromboembolic or hypercoagulable event is low. Although there is no high quality data to guide the treatment of SRAD, most published cases advocate for anticoagulation therapy, using heparin with bridge to warfarin for a typical duration of 3 months. Patients should be monitored for the development of renal failure and hypertension, while revascularization therapy should be considered for patients who develop complications from SRAD.

RHEUM SERVICE PLEASE! THE CASE OF AN UNUSUAL RASH Muneza Muhammad; Min Ji Kim; Maulin Shah. Baylor College of Medicine, Houston, TX. (Tracking ID #2199472)

LEARNING OBJECTIVE #1: Recognize need for histopathologic work-up in connective tissue diseases.

LEARNING OBJECTIVE #2: Understand higher risk of malignancy associated with dermatomyositis.

CASE: A 54 year old African American male with history of hypertension presented with a 4 week history of centrifugally spreading painful, pruritic, rash, myalgias, arthralgias, odynophagia, dysphagia, fatigue and malaise. He previously went to an outside hospital where he was diagnosed with contact dermatitis and prescribed a short course of oral steroids with no relief of his symptoms. On admission, he appeared to have erythematous and hyperpigmented, scaly patches and papules on the bilateral upper extremities, back, chest, periumbilical area, neck, ears and thighs. The bilateral periorbital skin, MCP, PIP, and DIP joints also appeared to have fine scale, erythema, and hyperpigmentation. He had 3/5 strength in the shoulders and hips bilaterally along with joint edema in the wrists and fingers. He was found to have AKI with granular and WBC casts; elevated CK in the 5000 s; and transaminitis. He was initially thought to have discoid or systemic lupus erythematosus or psoriatic arthritis. Rheumatologic workup was largely negative except for mildly elevated rheumatoid factor, ESR, CRP, and Aldolase. Skin biopsy was consistent with dermatomyositis and muscle biopsy was consistent with inflammatory myopathy. The patient was diagnosed with dermatomyositis and started on high dose steroids with improvement in his symptoms. AKI resolved with IV fluids and transaminitis improved after initiation of steroid therapy.

DISCUSSION: Dermatomyositis is a rare, idiopathic, inflammatory myopathy associated with skin manifestations. Classic skin findings like Gottron's papules, shawl sign, and heliotrope rash may aid in diagnosis, but are not always present. In this patient with dark skin, his rash and symptoms were a diagnostic mystery as his skin findings were not typical for dermatomyositis. He was misdiagnosed with contact dermatitis, DLE/SLE, and psoriatic arthritis before skin biopsy was done. It was only in hindsight, reviewing pictures of his initial presentation, that subtle skin manifestations were identified (like the heliotrope rash and Gottron's sign). Inflammation in darker skin can appear more violaceous and hyperpigmented, causing the clinician to miss subtleties in physical exam findings and misdiagnose the patient as it happened in this case. Thus, histopathologic diagnosis is crucial and necessary in any patient with rash and systemic symptoms even if serologic workup is negative or indeterminate. However, the work doesn't stop at diagnosis. Patients with dermatomyositis have a five to seven times higher incidence of cancer as compared to

the general population. Age-appropriate cancer screening should be initiated at time of diagnosis as peak incidence of malignancy diagnosis occurs within the 2 years before and after diagnosis. Tumor markers in our patient were negative and subsequent CT of the chest, abdomen, and pelvis did not reveal any malignancy. Diagnosing connective tissue diseases, like dermatomyositis, can be difficult given the rarity of the condition. This case highlights the need for histopathologic workup in patients with pigmented skin in which classic skin manifestations may not be as obvious. Additionally, it is always important to recognize the need for cancer screening in patients with these rare connective tissue diseases.

RIGHT UNDER HER NOSE Justin D. Kaner¹; Lauren Shapiro². ¹Einstein/Montefiore Medical Center, New York, NY; ²Montefiore Medical Center, Bronx, NY, NY. (Tracking ID #2198573)

LEARNING OBJECTIVE #1: Recognize the challenges of cancer diagnosis in an obese patient

LEARNING OBJECTIVE #2: Learn the basics of epidemiology, diagnosis, and prognosis of nasopharyngeal carcinoma

CASE: A 39 year old woman with a medical history significant for morbid obesity, presented with complaints of constipation, lower extremity weakness and severe leg and back pain for 3 months. Exam was significant for hypoactive bowel sounds, pain to palpation along the lumbar spine and the right femur and 4/5 muscle strength in the right lower extremity. Lymph node exam was unremarkable although limited due to her body habitus. Labs obtained at presentation were significant for a serum calcium of 19.2 mg/dL, creatinine of 4.4 mg/dL, BUN of 37 mg/dL, hemoglobin of 8.8 g/dL, white blood cell count of 16.4 k/u, lactate dehydrogenase of 506 U/L, parathyroid hormone of 10.2 pg/mL. SPEP showed two faint monoclonal bands. CT-scan with contrast as well as an MRI of the cervical/lumbar/thoracic spine showed extensive lytic bony lesions. There was no abdominal or pelvic adenopathy. The patient was treated for her hypercalcemia and her renal failure improved. Diagnosis had been presumed to be multiple myeloma given the constellation of above findings. Bone marrow biopsy was obtained and showed infiltrating poorly differentiated carcinoma. In addition, she had a negative UPEP and a normal kappa/lambda ratio, so we began a search for a primary tumor. Of note the patient informed us that she had told her primary care doctor about a cyst in her neck about 1 year prior, and that to this point it hadn't been evaluated further. A more extensive lymph node exam with better positioning revealed an enlarged cervical lymph node. Further imaging including an MRI with contrast of the face and neck as well as PET-CT showed a soft tissue thickening of the left adenoid in addition to extensive bilateral cervical and left sided retropharyngeal lymphadenopathy. Serum epstein-barr virus DNA pcr was obtained and was 51,800 copies/mL. Biopsy of the left adenoid soft tissue mass was performed and diagnosis was confirmed as metastatic epstein-barr virus positive undifferentiated non-keratinizing nasopharyngeal carcinoma.

DISCUSSION: Many studies have shown a strong association between body-mass index and cancer related mortality. In particular, obese non-smoking women seem to have the greatest association between mortality and body mass index. The risk extends to many common cancers in women including uterine, cervical and breast, but also includes cancers of the pancreas, kidneys and esophagus. The published data on the subject suggests that there are several possible explanations for this phenomenon, including that obese individuals are screened less and thus are diagnosed with a later stage of cancer. Several studies have shown that obese women are screened roughly 5 % less than their normal body-mass index counterparts for cancers of the breast and cervix. Other factors related to the association between body-mass index and cancer related mortality include poor functional and nutritional status, as well as the possibility that obesity itself can induce carcinogenesis. This highlights the importance of being aware of the challenges associated with obesity and cancer diagnosis. Nasopharyngeal carcinoma is an uncommon entity in the western world with an incidence of 0.5/100,000 people. In endemic areas such as southern China, incidence is as high as 25/100,000. In the US, common risk factors for nasopharyngeal carcinoma are smoking and alcohol use, similar to other head and neck cancers. Diagnosis requires a high clinical suspicion and should include a very thorough exam focusing on the lymph nodes of the head and neck. When patients present with early disease, they usually have local symptoms including headache, nasal congestion, bloody nose, ear infections and sometimes a patient may find a swollen lymph node in their neck. Nasopharyngeal carcinoma often mimics other more common conditions due to the type of symptoms it causes as well as its relatively "hidden" location. Distant metastases are decidedly uncommon and only represent a small percentage of presentations. In epstein-barr virus positive nasopharyngeal carcinoma, viral DNA can be demonstrated in the serum via a pcr test. This has been shown to have significant prognostic value, and can be used to evaluate for early signs of recurrence. Recurrence after successful treatment has been shown to occur from 3 to as many as 10 years after treatment, so monitoring is vital.

RITUXIMAB INDUCED SERUM SICKNESS Paras Karmacharya⁴; DILLI R. POUDEL⁴; Ranjan Pathak⁴; Sushil Ghimire⁴; Pragya Shrestha¹; Shawn Potteiger⁴; Madan R. Aryal³; Anthony Donato². ¹Nanjing MEdical College, Nanjing, China; ²Reading Health System, W. Reading, PA; ³The Reading Hospital and Medical Center, Wyomissing, PA; ⁴Reading Health System, West Reading, PA. (*Tracking ID #2199327*)

LEARNING OBJECTIVE #1: Recognize Rituximab Induced Serum Sickness (RISS) clinically as it may mimic exacerbation of various rheumatologic conditions

LEARNING OBJECTIVE #2: Avoid further infusions of rituximab in patients with a history of RISS as it may provoke more severe symptoms

CASE: A 57-year-old female with longstanding seropositive (rheumatoid factor positive, cyclic citrullinated peptide antibody negative) rheumatoid arthritis (RA) presented to the emergency department with a 1-day history of low-grade fever, pruritic rash all over her body and diffuse joint pains. It did not involve her mucous membranes or her palms and soles. She did not have any dyspnea, chest pain, angioedema, abdominal pain or loose stools. She noted receiving the first dose of rituximab 7 days prior and had mild rigors during infusion which was relieved with benadryl. She received pretreatment with acetaminophen and antihistamines however she had not received corticosteroids. Her medications included methotrexate 25 mg oral once weekly and hydroxychloroquine 200 mg twice daily for her treatment of active, refractory RA. She had failed multiple tumor necrosis factor (TNF) inhibitors previously and had undergone multiple joint replacements and arthrodeses. She noted no history of adverse reactions related to TNF inhibitors. Physical examination revealed temperature of 38.4 °C, heart rate 87 beats / minute and blood pressure 123/69 mm Hg. There was maculopapular skin eruption located face, scalp, trunk and both upper and lower extremities. There was no parotid gland enlargement or lymphadenopathy. Her musculoskeletal examination revealed active synovitis in the metacarpophalangeal and proximal interphalangeal joints. Laboratory parameters revealed a white blood cell count of 9710/mm³, hemoglobin 8.9 g/dL (baseline: 9.0 g/dL) and platelet count 25,000/mm³ (baseline: 30,000/mm³). ESR and CRP were elevated at 54 mm/h and 9.6 mg/L respectively. Blood chemistries and liver function tests were within the normal range. Complement levels were low with C3 level of 57 mg/dL (79–152 mg/dL), C4 level 8 mg/dL (12–42 mg/dL) and CH50 40 U/mL (31–60 mg/dL). Immunoglobulin (Ig) M level was decreased with a value of 43 mg/dL (46–30) while other immunoglobulin levels were within the reference range with IgG of 1470 mg/dL (751–1560 mg/dL) and IgA 647 mg/dL (82–453 mg/dL), IgM 43 mg/dL (46–304 mg/dL). Urinalysis did not reveal proteinuria or hematuria. Blood culture and urine cultures were negative. Diagnosis of rituximab-induced serum sickness was made on the basis of her classic clinical triad of fever, rash and arthralgia following rituximab infusion. Her symptoms resolved spontaneously over the next 2 days and she did not require corticosteroids at the time of discharge. She was advised to avoid further therapy with rituximab.

DISCUSSION: Serum sickness is a classic immune-complex(IC) mediated Type III delayed hypersensitivity reaction. The deposition of IC into the target tissues causes activation of the complement cascade and recruitment of mast cells and phagocytes. It usually occurs 10–14 days following antigen exposure or within a few days of secondary antigen exposure. Rituximab is a chimeric murine-human monoclonal antibody directed against CD20 antigen on the surface of B lymphocytes. Most commonly, it is associated with infusion reaction at the time of infusion which is thought to be related to immediate host cytokine release. RISS presents as a typical Type 3 hypersensitivity reaction with the classic triad of fever, rash and arthralgia. Other symptoms reported include myalgia, malaise, fatigue, conjunctival hyperemia and purpura. It has been reported in different rheumatologic (mostly Sjogren's syndrome) and hematological conditions. Most commonly it has been reported to occur following the second dose of the first cycle. The pathogenesis of RISS remains elusive. It has been found to be associated with conditions with concomitant hypergammaglobulinemia and rheumatoid factor positivity, leading some to speculate about the potential pathogenic role of elevated RF, immunoglobulins and human antichimeric antibody. Corticosteroids are the mainstay of management and symptoms are usually self-limited in mild cases. Repeat infusion of rituximab after RISS may not be appropriate, as patients have been reported to have more severe symptoms following a second exposure.

ROUND AND ROUND WE GO—WHERE THE WORMS STOP, ONLY THE ASTUTE CLINICIAN WILL KNOW Adrienne D. Workman¹; Josh Evans¹; Leigh K. Hunter². ¹Methodist Dallas Medical Center, Dallas, TX; ²Methodist Hospitals of Dallas, Dallas, TX. (*Tracking ID #2193145*)

LEARNING OBJECTIVE #1: Review *Strongyloides stercoralis*' complex life cycle and its impact on clinical presentation, symptomatology, complications and potentially delayed diagnosis

LEARNING OBJECTIVE #2: Recognize the hyperinfection syndrome of strongyloidiasis, its predisposing factors and manifestations, and review preventive and therapeutic strategies

CASE: A 55 year old Laotian man with past medical history significant for systemic lupus erythematosus complicated by stage IV-V nephritis, recurring pruritic skin rash, waxing and waning abdominal pain, diarrhea, and intermittent respiratory symptoms (with several "pneumonias") presented to the emergency department (ED) with significant worsening of these symptoms for approximately 1 week. Six months prior to his admission, he was hospitalized for respiratory failure necessitating intubation and worsened renal function requiring intensified immunosuppression with cyclophosphamide, high dose steroids and temporary hemodialysis. Since that time, the recurring GI, respiratory and dermatologic symptoms had intensified to the point of bloody diarrhea, dyspnea, hemoptysis, and pleuritic chest pain prompting his ED visit. Physical examination revealed the patient to be alert and oriented at time of admission. He was afebrile, tachycardic, tachypneic, and hypotensive with oxygen saturation of 96 % on 2 L oxygen. His lungs were clear to auscultation, heart was without gallop or rub, abdomen was mildly tender to palpation, rectal exam was notable for bloody stool, and skin exam demonstrated a papular, serpiginous, exanthem over his trunk, thighs and back. He had no joint tenderness or swelling and his cognitive function was intact. Laboratory values were significant for renal insufficiency, anemia, and mild elevation of transaminases. Chest radiograph demonstrated numerous bilateral lung nodules approximately 5 mm in diameter not observed on prior imaging. Extensive evaluation for infectious etiologies was undertaken and empiric antibiotic therapy with vancomycin, meropenem, moxifloxacin and trimethoprim/sulfamethoxazole was initiated. The patient rapidly deteriorated with progressive pulmonary infiltrates and hemorrhage, refractory shock, multiple organ failure and gastrointestinal bleeding. He subsequently expired and postmortem sputum specimen demonstrated a helminthic parasite confirmed as *Strongyloides stercoralis*.

DISCUSSION: *Strongyloides stercoralis* is a parasitic nematode endemic in tropical and subtropical regions around the world. Derived from the Greek word strongylos meaning round, the name *Strongyloides* appropriately refers to this roundworm endemic in Vietnam, Laos, and Cambodia where its prevalence is as high as 10 %. The highest rates in the US occur in residents of the southeastern portion of the country and in travelers to or immigrants from endemic areas. Infections have been reported to persist for more than 40 years in individuals secondary to *Strongyloides*' ability to autoinfect its host. Following infection, symptoms occur as the result of either the adult worm residing in the small bowel or by parasitic penetration and migration to distant tissues such as skin and lung. Gut symptoms are usually secondary to parasite-induced duodenitis resulting in abdominal pain, dyspepsia, diarrhea, nausea, or vomiting. Transpulmonary migration of larvae may manifest as dry cough, dyspnea, hemoptysis, recurrent fever, pneumonitis resembling bacterial pneumonia, acute respiratory failure, pulmonary embolism or asthma that paradoxically worsens with steroid use. Dermal migration produces distinctive, migratory eruptions with raised erythematous tracks known as larva currens. Presence of eosinophilia is not predictable and may be infrequent with the more serious hyperinfection syndrome. The diagnostic gold standard is serial stool exams, but sensitivity of a single stool sample is less than 50 % due to larvae being excreted intermittently and requires up to 7 stool exams to approach a sensitivity of 100 %. Duodenal aspirates and serologies may also be utilized. First line treatment is ivermectin with duration based on the patient's response and should be given until symptoms resolve with negative stool tests for two weeks. In conclusion, our patient succumbed to chronic strongyloidiasis, which transitioned to hyperinfection syndrome with intensified immunosuppression. This is an example of the importance of obtaining a complete and correct epidemiologic history in securing a prompt and accurate diagnosis. We will review *Strongyloides*' epidemiology, life cycle, predisposing conditions, common and uncommon presentations, complications, therapeutic options and prognosis.

SARCOMA SPOUT: A RARE CASE OF BILATERAL CHYLOTHORAX IN HIV/AIDS PATIENT WITH A HISTORY OF CUTANEOUS KAPOSI'S SARCOMA Kerri M. Lydon; Ali F. Yousif; Ricardo E. Nuila. Baylor College of Medicine, Houston, TX. (*Tracking ID #2200284*)

LEARNING OBJECTIVE #1: Recognize Kaposi's sarcoma as a cause of chylothorax

LEARNING OBJECTIVE #2: Chemotherapy should be considered in patient's with KS related chylous pleural effusion

CASE: A 25-year-old male with history of HIV/AIDS and Kaposi's Sarcoma (KS), who presented with two days of fever, left chest wall pain, and increasing shortness of breath. Denied productive cough, night sweats, or weight loss. Patient was diagnosed with HIV 2 years prior, developed cutaneous KS lesions on trunk and extremities few months later. Upon admission he has been compliant with highly active anti-retroviral therapy (HAART) for over 1 year with CD4 count of 316, and a viral load of 10,300. He received a total of 7 cycles of Doxorubicin for the KS with significant regression of cutaneous lesions. Exam was remarkable for temperature of 101.80 F, respiratory rate of 40 with normal oxygen saturation. Lung examination revealed absent breath sounds on the left. Few scattered Kaposi's skin lesions were observed on the right lateral chest wall. No oropharyngeal lesions or lymphadenopathy noted. CT chest showed areas of loculated

empyema in the left pleural space and an enlarging right pleural effusion. Left-sided thoracentesis and chest tube insertion yielded 2.3 Liters (L) of milky appearing fluid with analysis revealing triglycerides 2283 mg/dL, LDH 1073 U/L, Protein 6.5 g/dL, WBC 26.5 K/uL with neutrophilic predominance. Vital signs and respiratory status improved after thoracentesis. Cultures from the pleural fluid grew *Streptococcus mitis*. A chest tube inserted on the right also yielded milky fluid and studies consistent with a chylous effusion. In addition to antibiotics, patient was started on octreotide drip and low fat diet. He continued to have 4–5 L of chylous drainage daily and eventually underwent a left thoracotomy for decortication of the loculated empyema. Intraoperatively, a chyle leak was observed where a Kaposi's lesion was seen invading the thoracic duct. Surgical ligation of the duct was attempted. Given chest tubes continued to drain postoperatively greater than 2 L of chyle daily, one cycle of liposomal Doxorubicin was administered with significant reduction in output to <500 cc daily.

DISCUSSION: Kaposi's Sarcoma (KS) remains one of the most common AIDS-associated neoplasm, it is a highly vascular, usually mucocutaneous neoplasm caused by HHV8. An important distinction of the AIDS related KS is its increased propensity to involve visceral organs and lymphatics. Pulmonary manifestations of AIDS-related Kaposi's sarcoma include endobronchial, parenchymal, and pleural involvement. Chylothorax is a rare complication of pleural KS. It is associated with significant morbidity and mortality hence requiring prompt recognition. KS can metastasize to the thoracic duct (TD) as seen in our patient leading to obstruction of lymphatic drainage leading to chylothorax development. The management of chylothorax in AIDS-associated KS is often challenging since this is a rare presentation and lack of standard treatment algorithm. Most evidence-based studies for conservative management with octreotide infusions and low-fat diet are obtained from studies on pediatric populations and traumatic thoracic duct injuries. After failed conservative approaches and thoracic duct ligation, we initiated liposomal Doxorubicin infusion with notable reduction of chylous pleural effusion output. In addition to conservative management, early initiation of chemotherapy should be considered in patients with high output chylothorax secondary to KS.

SAVED MY CD4 CELLS; LOST MY PROXIMAL TUBULAR CELLS Marianna Sargsyan²; Sathish Krishnan²; Harsimran S. Sekhon¹. ¹Presence Saint Francis Hospital, Evanston, IL, Evanston, IL; ²Saint Francis Hospital, Evanston, IL. (Tracking ID #2198260)

LEARNING OBJECTIVE #1: Acute kidney injury (AKI) and Fanconi syndrome (FS) are infrequent complications of tenofovir. The pathogenesis underlying these adverse effects remains elusive. Tenofovir is primarily excreted by the proximal renal tubular cells. It is believed that the adverse effects are due to tenofovir-induced mitochondrial DNA depletion and direct cytotoxicity of the proximal tubular cells.

CASE: A 45 year old female was admitted with 3-day-history of lethargy and confusion. She had a past medical history of HIV, hypertension and schizoaffective disorder. Her medications included atazanavir, lamivudine, emtricitabine, tenofovir, metoprolol, quetiapine and sertraline. She did not have fever, chills, headache, cough, vomiting, diarrhea or dysuria. Her vital signs were within normal limits. On physical examination, she was lethargic and confused. No focal weakness was demonstrated. Laboratory work-up showed WBC 8600/mm cu, hemoglobin 12.6 g/dL, platelets 144,000/mm cu, serum glucose 108 mg/dL, creatinine 3.68 mg/dL, BUN 74 mg/dL, potassium 3.1 mEq/L, sodium 145 mEq/L, chloride 120 mEq/L, bicarbonate 16 mmol/L, albumin 3.1 mg/dL and phosphorus 1.6 mg/L. Her BUN and creatinine levels were normal 2 months prior to the admission. Despite continued replacement, her potassium and phosphorus levels remained low, and her hyperchloremic non-anion gap acidosis worsened. The fractional excretion of sodium was 3.2 % and trans-tubular potassium gradient was 8.4 consistent with intrinsic renal etiology for AKI and potassium wasting in urine respectively. Serum uric acid level was 1.9 mg/dL (2.4–7.1 mg/dL), urine pH was 5.4, and urinalysis showed glycosuria, proteinuria and aminoaciduria. A detailed review of her medications revealed that she was taking tenofovir in two forms: one as viread and another as truvada. She was diagnosed with tenofovir associated AKI and Fanconi syndrome. She was switched to a non-tenofovir containing regimen for HIV, and was treated with intravenous normal saline and potassium phosphate. Her lethargy and confusion resolved. At one month follow-up, her creatinine was 1.15 mg/dL, potassium was 4.6 mEq/dL and phosphorus was 3.0 mg/dL.

DISCUSSION: Proximal renal tubular dysfunction resulting from the tenofovir can cause impaired reabsorption of amino acids, glucose, uric acid, bicarbonate and phosphate. As a consequence, patients develop AKI, hypokalemia, hypophosphatemia, hypouricemia and non-anion gap metabolic acidosis. It usually occurs during the first year of the therapy but, can occur at any stage of the treatment. And the risk increases with higher doses and concomitant usage of other nephrotoxic drugs. AKI and FS usually resolve with the discontinuation of the drug, but occasionally, can result in irreversible renal injury. So, it is important that clinicians be aware of the potential adverse effects so that it can be recognized early and patients can be switched to alternate antiretroviral regimen. It is vital

to monitor renal function, serum electrolyte levels and urinalysis periodically in these patients.

SECONDARY HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS: RARE ETIOLOGY OF HEPATIC FAILURE AND REFRACTORY BLEEDING IN ADULTS Mahpara Khaliq¹; Roderick Go². ¹Stony Brook University Medical Center, Bay Shore, NY; ²Stony Brook University Medical Center, Stony Brook, NY. (Tracking ID #2199445)

LEARNING OBJECTIVE #1: Recognize the clinical features of Hemophagocytic Lymphohistiocytosis (HLH) in an adult patient

LEARNING OBJECTIVE #2: Understand the aggressive nature and need of rapid escalation of therapy in HLH

CASE: We present a 21 year old female from Ecuador with history of chronic hepatitis and atypical presentation of HELLP syndrome 2 years ago, who was first admitted with jaundice and progressively worsening liver function tests. Viral hepatitis serologies were negative. Liver biopsy at the time showed chronic active hepatitis, erythrophagocytosis and congestion. She was started on prednisone for presumed autoimmune hepatitis and was discharged. She presented a few days later with fever, hematochezia and fulminant liver failure. A bleeding scan localized the site to cecum and rectosigmoid colon and she underwent embolization. This was complicated by ischemic colitis, prompting a hemicolectomy with ileostomy. Due to her clinical presentation of pancytopenia, hepatosplenomegaly, persistent fevers, elevated Epstein-Barr virus (EBV) and biopsies of liver and bone marrow showing hemophagocytosis, she was diagnosed with secondary HLH. She was treated with intravenous corticosteroids and Rituximab; however, she failed to respond to therapy. Her hospital course was complicated by multiple episodes of spontaneous gastrointestinal bleeding and refractory coagulopathy despite numerous transfusions of platelets, fresh frozen plasma and cryoprecipitate. She underwent multiple endoscopies with clipping of small bowel vessel bleeding. Repeat laboratory tests for autoimmune and infectious etiologies were unremarkable except for markedly elevated EBV PCR studies (251,000 copies) and CMV (431 copies). After a prolonged hospital course, she ultimately developed urosepsis and expired shortly thereafter

DISCUSSION: Hemophagocytic lymphohistiocytosis (HLH) or hemophagocytic syndrome (HPS) is a rare, life-threatening and aggressive condition which leads to progressive multi-organ failure due to an unregulated immune response to extreme inflammation. There is a congenital form primarily seen in children and secondary form, seen in children and adults. Both forms are characterized by fevers, hepatosplenomegaly and bi or tri-lineage cytopenias. The key to success in treating HLH is an early diagnosis, which is a challenge given the rarity of the syndrome, variable clinical presentation and lack of specific clinical and laboratory findings. While the pathophysiology of secondary HLH remains unclear, the disease pattern is attributed to a cytokine storm leading to overactivation of antigen-presenting cells and upregulation of T cell immunity, causing end organ damage. Diagnostic criteria is met if at least five out of eight criteria are met. These include fever, splenomegaly, at least bi-lineage cytopenia, hypertriglyceridemia and/or hypofibrinogenemia, hemophagocytosis in bone marrow, spleen, CSF or lymph nodes, decreased or absent NK-cell activity, elevated ferritin and elevated soluble IL-2 receptor levels. Supportive evidence includes cerebral symptoms with moderate pleocytosis and/or elevated protein, elevated transaminases, bilirubin and lactate dehydrogenase. Without treatment, prognosis is poor and often fatal with mortality of 18–24 % in EBV related HLH. Treatment should include an early referral to hematology and evaluation for possible triggers in stable patients. Current treatment recommendations for HLH include intravenous corticosteroids and etoposide along with intrathecal therapy for those with CNS disease. Better responses may be seen with rituximab for EBV-related HLH. Due to the aggressive nature of secondary HLH, rapid escalation of treatment is necessary and consideration of hematopoietic stem cell transplant is sometimes necessary within hours to days of presentation. HLH is a rare entity in adults and outcomes are poor without early recognition; we recommend consideration of this disease in the setting of persistent hepatitis, fevers, refractory cytopenias and global inflammation.

SEPSIS DUE TO LISTERIA BACTEREMIA AS INITIAL PRESENTATION OF HODGKIN LYMPHOMA Jin Xu; Dhruvatej Boddupalli; Sarah Apgar. Yale School of Medicine, New Haven, CT. (Tracking ID #2199075)

LEARNING OBJECTIVE #1: Recognize the association between listeriosis and underlying malignancy.

LEARNING OBJECTIVE #2: Review the importance of excisional lymph node biopsy for the diagnosis of Hodgkin lymphoma.

CASE: A 53-year-old man with past medical history of heavy alcohol use presented to the emergency room with a 1-month history of worsening fatigue, night sweats, daily high fevers, and 20-lb weight loss over 3 months. He was treated empirically by his primary care physician with amoxicillin/clavulanic acid 1 week prior to admission without

improvement. Physical exam was significant for temperature 102.9 °F, heart rate 110 beats per minute, splenomegaly, and bilateral axillary and inguinal lymphadenopathy. Initial laboratory testing was notable for sodium 129 mmol/L, hemoglobin 7.7 g/dL, aspartate transaminase (AST) 49 U/L, alanine transaminase (ALT) 50 U/L, sedimentation rate 120 mm/hr, C-reactive protein 234 mg/L, ferritin 2950 ng/mL, otherwise normal basic chemistries and normal white blood count and platelets. Computed tomography (CT) revealed splenomegaly to 14.2 cm, mediastinal and axillary lymph nodes up to 1.2 cm in diameter, and abdominal (paracaval and paraaortic) lymph nodes up to 3 cm in diameter. Within 24 h of admission, blood cultures returned positive for *Listeria monocytogenes*, and treatment was initiated with intravenous (IV) ampicillin and gentamicin. Soon after the initiation of antibiotics, the patient complained of a severe headache, associated with high fevers, tachycardia, and meningeal signs. Cerebrospinal fluid (CSF) revealed 1100 cells/uL with 92 % granulocytes, glucose 54 mg/dL and protein 93 mg/dL. CSF cultures for bacteria, fungi and acid-fast bacteria as well as viral studies were all negative. Headache and meningeal signs improved with treatment for presumed *Listeria* meningitis, however the patient continued to spike high fevers daily. Further evaluation of his lymphadenopathy with CT-guided core tissue biopsy of the retroperitoneal lymph nodes revealed fibrous adipose tissue with mixed inflammatory cell proliferation. Bone marrow biopsy revealed hypercellular marrow but no evidence of a malignant process. Positron emission tomography (PET) was performed to help guide further diagnostic testing, which confirmed intensely hypermetabolic lymph nodes, most notable in the right axilla, mediastinum and retroperitoneum. Excisional lymph node biopsy of two axillary lymph nodes revealed classic Hodgkin lymphoma. Chemotherapy was subsequently initiated with resolution of fevers.

DISCUSSION: This case illustrates an example of sepsis due to *Listeria monocytogenes* and presumed *Listeria* meningitis in a patient with undiagnosed Hodgkin lymphoma. *Listeria monocytogenes*, a gram-positive facultative anaerobic rod, is well-known to affect immunocompromised patients. There are multiple case reports in the literature of *Listeria* bacteremia or meningitis found in patients with previously known immunosuppressive states, including leukemias and lymphomas. Our patient, however, was an unusual case in whom listeriosis was the initial presentation of underlying Hodgkin lymphoma. Systemic listeriosis carries a high mortality rate if not recognized early, and should be considered and empirically treated in patients with suspected underlying malignancy, especially if evidence of meningitis is present. This case further underscores the importance of excisional lymph node biopsy for the diagnosis of Hodgkin's lymphoma. Although this patient's largest lymph nodes were in the retroperitoneum, CT-guided core biopsy of these lymph nodes was not diagnostic. Excisional biopsy of the smaller axillary lymph nodes revealed the diagnosis of Hodgkin lymphoma.

SEROTONIN SYNDROME INDUCED BY THE COMBINATION OF LAMOTRIGINE, ARIPIRAZOLE AND COCAINE Anupam Kotwal¹; Sarah L. Cutrona². ¹University of Massachusetts, Worcester, MA; ²University of Massachusetts Medical School and Meyers Primary Care Institute, Worcester, MA. (Tracking ID #2193948)

LEARNING OBJECTIVE #1: Recognize the clinical features and management of Serotonin syndrome

CASE: A 24 year old female with a history of bipolar disorder was admitted for nausea, dizziness and jitteriness that started after intentional ingestion of 4 gm of lamotrigine and 80 mg of aripiprazole, in addition to cocaine abuse. Physical examination revealed diaphoresis, tachycardia, bilateral horizontal nystagmus, and bilateral lower extremity hyperreflexia with inducible patellar and ankle clonus. Laboratory studies were remarkable for mildly elevated liver enzymes that normalized within 24 h. Urine was positive for codeine, cocaine and lamotrigine. Blood levels of lamotrigine and aripiprazole drawn on the date of admission were within normal limits. She was diagnosed with Serotonin syndrome (SS) with severity classified as mild. Lamotrigine and Aripiprazole were discontinued, and Lorazepam was given for symptomatic management. During the hospital stay, her tachycardia, nystagmus, clonus and hyperreflexia resolved within 48 h. Her symptoms of nausea, dizziness, jitteriness and diaphoresis also resolved. This was followed by initiation of Divalproex and Risperidone for her psychiatric condition. On follow up, she continued to abuse cocaine, but did not develop similar clinical features.

DISCUSSION: SS is a potentially life-threatening condition associated with increased serotonergic activity in the central nervous system (CNS). It is characterized by mental status changes, autonomic hyperactivity and neuromuscular abnormalities along a spectrum ranging from mild to severe. Using the Hunter criteria, diagnosis is established if the patient has taken a serotonergic agent and meets any one of the following criteria: spontaneous clonus; inducible clonus plus agitation or diaphoresis; ocular clonus plus agitation or diaphoresis; tremor plus hyperreflexia; hypertonia plus temperature above 38°C plus ocular clonus or inducible clonus. Differential diagnoses include anticholinergic poisoning, malignant hyperthermia, neuroleptic malignant syndrome and sympathomimetic toxicity. SSRIs are perhaps the most commonly implicated medications

associated with this syndrome. Our patient developed features of SS after the ingestion of higher than prescribed doses of Lamotrigine and Aripiprazole, in addition to cocaine abuse. None of these agents have strong serotonergic activity by themselves, and the blood levels of lamotrigine and aripiprazole in our patient were within normal limits. However, these agents do have some effect on serotonin neurotransmission. Lamotrigine has a weak inhibitory effect on 5-HT₃ receptor, Aripiprazole is a partial agonist at 5-HT_{1A} receptor and an antagonist at serotonin reuptake transporter, and Cocaine increases the release and inhibits the reuptake of serotonin at the synaptic cleft. An extensive literature search on PubMed did not yield any case description of SS induced by these agents alone or in combination. Also, Micromedex and Epocrates do not list this syndrome as an adverse effect for any of these agents. To conclude, the pharmacokinetic and pharmacodynamic interactions between Lamotrigine, Aripiprazole and Cocaine can lead to increased CNS serotonergic activity. Hence, SS should be considered in a patient who takes these medications and demonstrates even subtle features of neuromuscular hyperactivity. Management includes discontinuation of the offending agents, supportive care and benzodiazepines for symptom control, with serotonin antagonists being a last resort.

SEVERE CHOLESTATIC JAUNDICE LEADING TO AN UNFORESEEN DIAGNOSIS Andrew Whipple¹; Steve Abshagen²; Timothy Schubert¹. ¹Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI; ²Portage Gastroenterology, Portage, MI. (Tracking ID #2194853)

LEARNING OBJECTIVE #1: Consider AL amyloidosis in patients presenting with cholestatic jaundice of unknown etiology.

LEARNING OBJECTIVE #2: Recognize that severe hepatic involvement resulting in cholestatic jaundice is considered to be a pre-terminal sign in AL amyloidosis.

CASE: A 72 year old female presented with a 2 month history of progressive pruritis, jaundice, and diarrhea. She also admitted to fatigue and a 30 pound weight loss over the preceding 6 months, but otherwise denied abdominal pain, melena, or alcohol use. Her past medical history included hypertension and well controlled diabetes mellitus type 2 and a previous 45 pack-year smoking history. Initial labs were remarkable for total bilirubin 11.3 mg/dL, alkaline phosphatase 479 U/L, and liver enzymes twice the upper limit of normal. Ultrasound demonstrated increased echogenicity of the liver, a 1.3 cm sludgeball in the gallbladder, and no biliary dilatation. Hepatobiliary scan and endoscopic ultrasound were both unremarkable. Liver biopsy subsequently revealed amyloidosis with amorphous, eosinophilic deposits predominately within the portal areas, surrounding and compressing the bile ducts and intra-hepatic blood vessels. Further laboratory workup resulted in a final diagnosis of AL (primary) amyloidosis.

DISCUSSION: AL amyloidosis is characterized by abnormal immunoglobulin light chains with subsequent organ deposition and dysfunction. Up to 70 % of systemic amyloid cases demonstrate hepatic involvement, and typical findings include hepatomegaly and elevated alkaline phosphatase. While hepatic involvement in AL amyloidosis is common, the overall clinical significance of this is mild or often absent. In two published series of primary AL-type amyloidosis, Kyle et al. reported the incidence of an elevated serum total bilirubin level to be between 4 and 8 %. More precisely, the presence of clinical jaundice resulting from severe intrahepatic cholestasis is even less common, and seen in less than 3 % of cases. This is an important distinction to make, as the presence of jaundice carries a particularly poor prognosis and considered to be a pre-terminal sign from hepatic involvement in amyloidosis. In fact, analysis by Gertz et al. suggested an elevated total bilirubin > 3 mg/dL correlated with an average 1.8 month life expectancy, and 80 % of reported patients died within 6 months after the onset of clinical jaundice. The cholestasis seen with amyloidosis is related to direct compression of intrahepatic bile ducts by amyloid deposits in the portal area and sinusoidal spaces. A low threshold for liver biopsy at the onset of suspicion for amyloidosis can provide early diagnosis so aggressive treatment, or palliative options can be offered. Our case serves as a reminder of the variable presentations of amyloidosis, which includes intrahepatic cholestasis, and that the presence of jaundice is indicative of an extremely poor prognosis.

SEVERE COBALAMIN DEFICIENCY DISGUISED AS MICROANGIOPATHIC HEMOLYTIC ANEMIA Gagandeep Cheema. Henry Ford Hospital, Royal Oak, MI. (Tracking ID #2198926)

LEARNING OBJECTIVE #1: Recognize the rare hematological presentations of severe B12 deficiency.

CASE: A 27-year-old female with no prior past medical history presented with non-specific complaints of malaise, fatigue, dizziness, and nausea. Her history was significant for exposure to both Ciprofloxacin and Nitrofurantoin in the preceding weeks for a UTI. Her initial evaluation revealed severe pancytopenia with a Hemoglobin of 4.8 g/dL and a platelet count of 53 K/uL. Her physical exam and vital signs were unremarkable, except for pallor. Further workup was suggestive of severe hemolysis, with an elevated LDH of

4476 IU/L and low haptoglobin of <8 mg/dL. The peripheral blood smear showed schistocytes and fragmented red blood cells, compatible with microangiopathic hemolytic anemia (MAHA). The patient was started on steroids for suspected autoimmune hemolytic anemia. However, Coombs test was negative, and her hemoglobin responded appropriately to multiple transfusions of packed red blood cells, therefore steroids were discontinued. An extensive hematological workup eventually revealed severe B12 deficiency with positive intrinsic factor antibodies. The patient was treated with subcutaneous B12 injections and had near normalization of her hematological indices within 3 weeks of initiating treatment.

DISCUSSION: RBC fragmentation and destruction associated with severe vitamin B12 deficiency is a relatively rare and underreported phenomenon. It is attributed to ineffective erythropoiesis leading to intramedullary hemolysis. This type of “pseudo-thrombotic microangiopathy” is commonly misdiagnosed and treated as TTP. One small retrospective study has found that the pseudo-thrombotic microangiopathy has been associated with lower reticulocyte counts and higher LDH levels than true TTP, as was seen in our case.

SEVERE MYELOSUPPRESSION SECONDARY TO ACCIDENTAL DAILY METHOTREXATE Bharat Rao; Shahzaib Nabi; Rohit Gulati; Michael H. Lazar. Henry Ford Hospital, Detroit, MI. (Tracking ID #2189080)

LEARNING OBJECTIVE #1: Early recognition and treatment of methotrexate toxicity and associated myelosuppression.

LEARNING OBJECTIVE #2: Importance of medication reconciliation in patient care.

CASE: A 67-year-old Hispanic female presented with a 5-day history of bleeding sores from her mouth, pain on swallowing, watery diarrhea, and fatigue. She has a history of breast cancer diagnosed and treated 10 years ago with lumpectomy, chemotherapy, and radiation. She also has a significant history of psoriasis and diabetes mellitus type 2. She has no personal or family history of autoimmune diseases, leukemia, or lymphoma. She reported taking an unknown medication for psoriasis. On exam, she was febrile and tachycardic. She had erosions of lips with associated bleeding and oral ulcerations. Her abdominal exam revealed mild diffuse tenderness but no hepatosplenomegaly. Lab work revealed pancytopenia that decreased progressively to WBC 0.4 billion cells/L (ANC 0), hemoglobin 6.6 g/dL, and platelet count 17 billion/L. Other remarkable initial labs included elevated transaminases (AST 183 U/L, ALT 157 U/L). The initial differential diagnosis included acute leukemia, drug induced pancytopenia, and infectious processes. Broad-spectrum antibiotics were initiated during admission for neutropenic fever. Initial infectious work-up was negative. Further hematologic labs revealed normal iron studies and vitamin B12 level, low reticulocyte count and low folate (4.7 ng/ml). She underwent a bone marrow biopsy, which revealed marked trilineage hypoplastic bone marrow without definitive evidence of lymphoproliferative disease. She did receive blood transfusions given low hemoglobin. On day five the patient's family brought her medications along with her pillbox. It was discovered she was prescribed methotrexate 10 mg weekly. However, on inspection of her weekly pillbox, she was noted to have a methotrexate tablet for each day. A presumptive diagnosis of methotrexate toxicity was given. She was immediately initiated on intravenous folic acid treatment. Methotrexate level was ordered on day five of admission, and returned <0.10 umol/L; however this was several days after her last exposure. Given she still had diarrhea and persistent fevers, a CT abdomen was ordered to rule out enterocolitis; it revealed cholelithiasis, with mild fat stranding surrounding the gallbladder. This was followed by a HIDA scan with findings consistent with acute cholecystitis. She also had urinalysis that was positive for ampicillin-resistant and vancomycin-resistant enterococcus. Clostridium difficile testing was negative during admission. Although she was clinically asymptomatic from gallstones at the time of imaging, it was decided to pursue cholecystostomy placement in light of her neutropenia and persistent fevers. Her antibiotic coverage was changed to cefepime and metronidazole for cholecystitis, and daptomycin for the enterococcus. In addition, the decision was made to administer her granulocyte-colony stimulating factor. During her clinical course, she showed gradual symptomatic improvement and her blood counts increased. Upon follow-up with hematology as an outpatient, her blood counts had normalized and she was reportedly doing well.

DISCUSSION: Methotrexate has been used as a treatment of psoriasis for many years and is generally prescribed as a low dose taken weekly. Generally, severe side effects are rare when taken as prescribed and with folic acid supplementation. This case highlights several clinical clues to identifying methotrexate toxicity including stomatitis, GI symptoms, fatigue, fever and transaminitis. However, it is important to recognize that fever should not be solely attributed to drug induced toxicity, and that infectious etiologies should be ruled out. Her labs showed low folate secondary to methotrexate's antagonist effect on dihydrofolate reductase and replacement is one of the mainstays of overdose treatment. Myelosuppression, as in this case, can be fatal and treatment should focus on rapid identification and treatment of an underlying etiology, empiric antibiotic coverage for neutropenic fever, supportive transfusions as needed, and consideration of granulocyte stimulating factors. Moreover, one of the most important learning points in this case is that

a thorough medication review including efforts to identify unknown medications or non-traditional medications might lead to an earlier diagnosis. It is also important to ensure patient understanding of medication doses and frequency upon prescribing in order to prevent severe adverse events like in this case.

SEVERE PULMONARY HYPERTENSION FROM CHRONIC, UNTREATED POLYMYOSITIS WITHOUT INTERSTITIAL LUNG DISEASE Benjamin Barbash²; David M. Levine²; Natalie K. Levy¹. ¹NYU School of Medicine, Bellevue Hospital, New York, NY; ²New York University School of Medicine, New York, NY. (Tracking ID #2196353)

LEARNING OBJECTIVE #1: Describe the natural history of polymyositis

LEARNING OBJECTIVE #2: Formulate a differential diagnosis for shortness of breath in patients with polymyositis

CASE: A 68 year-old female with hypertension, osteoporosis, and polymyositis (PM) presented with two weeks of severe shortness of breath at rest. Eight years prior she developed quadriceps weakness, which gradually progressed such that she became bed-bound 3 years prior. PM was diagnosed by a neuromuscular specialist 7 months prior, after deltoid muscle biopsy demonstrated degenerative muscle fibers without inclusions, consistent with chronic PM. Daily high-dose prednisone was started 6 months prior to admission, but the patient was subsequently lost to follow-up. Her exam revealed 95 % saturation on 4 L oxygen with rapid, shallow breaths, accessory muscle use, 1/5 bilateral proximal muscle strength, and 5/5 distal muscle strength. TTE demonstrated moderate-to-severe pulmonary hypertension (PH), severe right ventricular dilatation, preserved LVEF, and no anatomic defects or shunting. Chest CT and V/Q scan showed no thromboembolic disease and no interstitial lung disease (ILD). Right heart catheterization demonstrated pulmonary artery pressure 68/19 mmHg, wedge pressure 12 mmHg (no vasodilator response). Sleep study ruled out OSA. FEV1 was 0.55 L, FVC 0.69 L, FEV1/FVC 79 %, DLCO 3.7 mL/mmHg/min (normal is 15.8 mL/mmHg/min), and mean inspiratory pressure -17cmH2O (normal range -65cmH2O to -95cmH2O). Labs showed normal serum ESR, CRP, CPK, aldolase, negative antibodies to Jo-1, scl70, anti centromere, SSA, SSB, RNP, and smith. ANA and dsDNA were both weakly positive (1:40 [nucleolar] and 11 IU/mL, respectively). A trial of mycophenolate mofetil and prednisone provided no symptomatic improvement. Physical therapy and overnight bilevel offered minimal symptomatic relief.

DISCUSSION: Our case highlights the natural history of PM and the importance of maintaining a broad differential for SOB. PM is an idiopathic inflammatory myopathy characterized by proximal skeletal muscle weakness. Diagnostic criteria vary but generally rely on clinical (symmetric proximal weakness), laboratory (elevated CK, aldolase, or liver enzymes), electromyographic (irritable myopathy), radiographic (MRI with muscle inflammation), and histologic (inflammatory infiltration) criteria. Patients are diagnosed with definite, probable, or possible PM based on the number of criteria met. Our patient regrettably represents the natural history of untreated PM: proximal muscle inflammation and weakness that progresses to severe debilitation and non-viable muscle tissue. Active disease is treated with steroids and/or immune modulator therapy. However, therapy has limited value in longstanding disease, as in our patient. To our knowledge, this is the first account of PH secondary to PM without the presence of ILD. While the association of PH with various connective tissue diseases (particularly scleroderma) is well known, knowledge of PM-induced PH is limited. Two other cases with ILD have been described, while 8 additional patients with overlap of PM-dermatomyositis and PM-Sjogrens have been reported. The differential diagnosis for PH generally includes 5 groups: pulmonary arterial hypertension, PH secondary to left heart disease, PH due to lung disease, PH from chronic thromboembolic disease, and PH due to unclear multifactorial mechanisms. As our patient lacked significant left heart disease and unclear pulmonary dysfunction, she required PFTs, V/Q scan, polysomnography, autoimmune testing, and cardiac catheterization to rule out all but the last of these groups, leaving PM the cause of her PH. While the pathophysiology of PM-induced PH without ILD is not well understood, we postulate that diaphragmatic weakness causes poor lung expansion, atelectasis, and chronic hypoxemia, with ensuing PH. Our case illustrates the importance of early recognition of PM and is the first account of PM-induced PH in the absence of ILD.

SEVERE THROMBOCYTOPENIA CAUSED BY NASH Gen Yamada²; Christine Kwan^{1, 2}. ¹Teine Keijinkai Hospital, Arlington, TX; ²Teine Keijinkai Hospital, Sapporo, Japan. (Tracking ID #2199817)

LEARNING OBJECTIVE #1: Recognize that severe thrombocytopenia can be caused by nonalcoholic steatohepatitis (NASH)

CASE: A 39-year-old Asian woman is transferred for possible splenectomy. She initially visits her primary care physician 5 weeks ago with gingival bleeding and purpura for which blood tests show platelet counts <2000 /L and slightly elevated liver function tests.

Bone marrow biopsy is consistent with idiopathic thrombocytopenic purpura for which she is given prednisolone for 10 days with partial response, so splenectomy is considered. She also reports slight appetite loss, but other review of systems is within normal limits (WNL). Past medical history includes diabetes mellitus II (DMII) on sitagliptin and miglitol and fatty liver on ursodeoxycholic acid. The patient has no known drug or food allergies. She does not smoke, drink, or use recreational drugs. Her father also has DMII. On physical examination, the patient's body mass index is 34.6 kg/m². Her vital signs include temperature 36, blood pressure 134/68, heart rate 78, respiratory rate 12, and oxygen saturation 99 % room air. Head and neck exam shows no nasal or gingival bleeding. Her abdomen is soft, obese, non-distended, and non-tender with positive bowel sounds; spleen and liver exams are limited. She has no abdominal wall vascular collaterals or shifting dullness. Skin exam reveals ecchymosis at venipuncture sites and erythematous papules on her face. The rest of her exam is WNL. Labs, including complete blood counts, chemistries, and coagulation panel, are WNL except platelet 17,000/mcL, HbA1c 7.8 %, GGTP 91 IU/L, and prothrombin activity 74.3 %; copper is not measured. Hepatitis B/C and human immunodeficiency antibodies are negative. Peripheral blood smear shows no abnormalities. After platelet transfusions, abdominal ultrasound shows a fatty liver and enlarged spleen; computed tomography (CT) confirms an 11 × 16 cm enlarged spleen with renal-splenic collaterals. Upper gastrointestinal endoscopy shows no abnormalities. Given the differential diagnosis of cirrhosis from NASH, the patient undergoes splenectomy and liver biopsy, which shows hepatic steatosis, inflammation, and fibrosis, consistent with NASH (Matteoni classification type 4/nonalcoholic fatty liver disease (NAFLD) activity score 4). After splenectomy, her platelet count recovers to >200,000 /mcL.

DISCUSSION: Risk factors for NAFLD, the most common liver disease in the world, include DMII, dyslipidemia, and obesity. It can be divided into non-NASH and NASH, which is more likely to develop cirrhosis. NAFLD patients are usually asymptomatic, but some NASH patients develop fatigue, malaise, abdominal pain, and hepatomegaly (18 %), in addition to signs/symptoms of cirrhosis. Lab data may show increased AST, ALT, and ferritin. While this patient's liver biopsy shows NAFLD, she has no alcohol use; other causes of secondary hepatic steatosis, such as hepatitis virus, medications, and Wilson's disease, are less likely. She is thus diagnosed with NASH cirrhosis. Severe thrombocytopenia (<50,000 /mcL) is rare in cirrhotic patients, and only 1 % need transfusion. The mechanism is due to increased pooling of platelets in the enlarged spleen and decreased liver production of thrombopoietin. The most common cause of thrombocytopenia in outpatients is due to liver disease (58 %), and the prevalence of NAFLD is increasing. Recently, NAFLD accounts for 75 % of chronic liver disease; NASH can thus cause severe thrombocytopenia due to cryptogenic cirrhosis like the above patient.

SHORTNESS OF BREATH IN PREGNANCY Megha Prasad. Mayo Clinic, Rochester, CA. (Tracking ID #2199455)

LEARNING OBJECTIVE #1: –To understand the presentation and management of peripartum cardiomyopathy

LEARNING OBJECTIVE #2: –To avoid premature closure when evaluating a common, nonspecific chief complaint

CASE: Our patient is a 27 year old lady G1P0 female at 39 weeks gestation who presented to the Emergency Department with a 2 week history of cough, insomnia, shortness of breath and palpitations. She had been seen at local clinic and her shortness of breath was thought to be secondary to her fullterm pregnancy. When the patient presented to our emergency department, physical examination revealed regular, rapid rate, 3/6 holosystolic murmur, inspiratory wheezing, as well as bibasilar crackles. EKG demonstrated sinus tachycardia, Q waves in leads I and AVR and right axis deviation. Chest X ray was significant for marked enlargement of cardiac silhouette with increased opacity over the heart suggestive of pericardial effusion. Echo revealed left ventricular enlargement and generalized hypokinesis with an LVEF of 20 % as well as mild mitral and tricuspid valve regurgitation. CT Chest ruled out pulmonary embolism, and demonstrated moderate cardiomegaly with a moderate sized pericardial effusion as well as a small right pleural effusion. Cardiac magnetic resonance imaging ruled out any underlying myocarditis. The patient was diagnosed with peripartum cardiomyopathy in light of her clinical history and imaging findings. The patient was saturating 90 % on 2 L of oxygen. She was induced to accelerate delivery, however as respiratory distress worsened, she required emergency cesarean section. She was diuresed acutely with intravenous furosemide, and continued on oxygen. As her condition stabilized, carvedilol and digoxin were initiated. The patient was also anticoagulated with heparin, and then warfarin due to her high risk of thromboembolism in light of her low ejection fraction, and inherent postpartum clotting risk. The patient's moderate sized pericardial effusion was drained via pericardiocentesis and the patient recovered appropriately with her home medications which included warfarin, carvedilol, lisinopril and furosemide. Bromocriptine, traditionally used to treat hyperprolactinemia, has been recently recognized as having benefit in peripartum cardiomyopathy. The medication is associated with a significant risk of venous thromboembolism however. Risk and benefits of bromocriptine initiation were carefully reviewed. The

decision was made to not use bromocriptine due to increased risk of venous thromboembolism. The patient returned home and was followed in heart failure clinic for resolution of symptoms. She regained normal cardiac function on repeat echocardiogram, and her ejection fraction improved in the postpartum period. She did not require placement of implantable cardiac defibrillator.

DISCUSSION: Our patient represents an unusual presentation of peripartum cardiomyopathy. Significant pericardial effusion is a rare complication of peripartum cardiomyopathy and is generally associated with an underlying autoimmune process such as myocarditis, ruled out by Cardiac MRI in our patient. Furthermore, while the etiology of peripartum cardiomyopathy is unknown, several studies have suggested underlying viral illness as a precipitant. Our patient's history of sick contact and viral URI prior to presentation may provide an explanation for her condition. Our case also highlights the importance of risk benefit analysis when treating a postpartum patient. The patient was discharged on warfarin for anticoagulation in light of her reduced ejection fraction and risk of thromboembolism. The need for thrombosis prophylaxis outweighed the tangible risks of postpartum hemorrhage as well as the contraindication to breastfeeding. Furthermore, despite recent advances in peripartum cardiomyopathy noted with bromocriptine use, we did not administer bromocriptine. When evaluating patients in the peripartum period, symptoms of shortness of breath and chest pain should be carefully considered and peripartum cardiomyopathy should be ruled out. Patients with peripartum cardiomyopathy have a good prognosis if managed appropriately in the outpatient setting. Also, it is important to maintain a wide differential when managing common chief complaints. Premature closure may lead to missed diagnoses, as in this patient, who was dismissed as having shortness of breath due to her pregnancy several times before undergoing complete evaluation. Other important causes of shortness of breath to be aware of in a pregnant female include pulmonary thromboembolism and spontaneous coronary artery dissection. Pregnant women with new onset symptoms of shortness of breath should undergo thorough evaluation to rule out lifethreatening causes such as these.

SIGNIFICANCE OF UP-SLOPING ST-SEGMENT DEPRESSION WITH TALL POSITIVE T-WAVE Naoki Misumida; Akihiro Kobayashi. Beth Israel Medical Center, New York, NY. (Tracking ID #2196314)

LEARNING OBJECTIVE #1: Identify up-sloping ST-segment depression as a possible sign of ongoing ischemia in patients with suspected acute coronary syndrome

CASE: A 91-year-old woman with a history of coronary artery disease status post stent placement presented with chest pain lasting for 4 h. Chest pain was constant, pressure sensation, non-radiating, and located in her left chest. Her blood pressure was 134/73 mmHg, pulse rate was 111 /min, respiratory rate was 18 /min, and oxygen saturation was 96 % on 2 L of oxygen via nasal cannula. The patient had bilateral basilar crackles without jugular venous distention or leg edema. Chest X-ray revealed mild pulmonary vascular congestion. Electrocardiogram revealed sinus tachycardia and up-sloping ST-segment depression with tall positive T waves in anterior leads, which were new when compared to her previous electrocardiogram. Patient was diagnosed with non-ST-segment elevation acute coronary syndrome and treated with heparin infusion and antiplatelet therapy. The laboratory tests revealed an elevated troponin I of 64 µg/ml. Troponin was further elevated to 116 µg/ml 4 h later. The patient was subsequently taken to an urgent cardiac catheterization, which showed a total occlusion of the left circumflex artery. She underwent percutaneous coronary intervention with stent placement. The patient suffered from large myocardial infarction and became persistently hypotensive despite extensive treatments including pharmacologic therapy and intra-aortic balloon pump. Patient's cardiac function did not recover and the patient died on day nine because of cardiogenic shock.

DISCUSSION: The present case illustrated the significant diagnostic value of up-sloping ST-segment depression in risk stratification in patients with non-ST-segment elevation acute coronary syndrome. Up-sloping ST-segment depression has not been historically considered to represent ischemia, as it is often observed in patients with tachycardia. Indeed, the current guideline for the diagnosis of myocardial infarction includes only horizontal and down-sloping ST-segment depression. Several recent studies, however, reported that up-sloping ST-segment depression, especially when accompanied with tall T waves, may represent ongoing ischemia of left anterior descending artery or left circumflex artery territories. In the present case, up-sloping ST depression was caused by a total occlusion of left circumflex artery. The interpretation of an electrocardiogram is the central part of the management of acute coronary syndrome. High-risk patients, those with significant electrocardiographic change or positive cardiac biomarker, will receive greater benefit from an early invasive strategy. Therefore, early recognition of ischemic ST-segment change is crucial to guide the further management including the timing of coronary angiogram and revascularization, and the choice of pharmacologic agents. In conclusion, up-sloping ST depression may represent ongoing ischemia in patients with acute coronary syndrome, though this finding can also be seen in patients with

tachycardia. Identifying up-sloping ST-segment depression as a possible sign of ongoing ischemia will allow internists to provide appropriate care, including a timely referral for invasive treatment, to patients with suspected acute coronary syndrome.

SLOW AND STEADY WINS THE RACE Cecilia Berardi; Darlene LeFrancois. Montefiore Medical Center, Bronx, NY. (Tracking ID #2194006)

LEARNING OBJECTIVE #1: Recognize atrial flutter presentations in elderly populations

LEARNING OBJECTIVE #2: Manage arrhythmias in patients with history of left ventricular outflow obstruction

CASE: A 90 year-old female experienced the sudden onset of palpitations and chest tightness causing her to gasp for air on the morning of admission while she was getting out of the shower. The patient's past medical history was significant for known left ventricular concentric hypertrophy with a small hyperdynamic left ventricle and a severe outflow gradient with systolic anterior motion (SAM) of the mitral valve documented previously in the setting of diuretic use, hypertension on daily metoprolol and benazepril, and hyperlipidemia on atorvastatin. The patient's presenting blood pressure was 154/107 mmHg, heart rate 132 bpm, her oxygen saturation was 95 %, she was afebrile. Her physical exam was significant for rales at the lung bases but no peripheral edema. Electrocardiogram revealed a regular QRS complex; due to the fast rate, p waves were difficult to detect and the rhythm was initially interpreted as sinus tachycardia. Cardiac enzymes were normal, as was pro-BNP. The patient was given two liters of normal saline and continued on metoprolol but subsequently experienced a reduction in blood pressure. Metoprolol 5 mg was given twice with no change in rate or rhythm. After adenosine 6 mg transiently slowed the ventricular rate, atrial flutter was noted on telemetry with a heart rate of 125 bpm in a 2:1 atrioventricular (AV) conduction pattern. Enoxaparin was started and successful electrical cardioversion was performed after a trans-esophageal echo showed normal left atrium size with no thrombus. The patient's symptoms improved and she was discharged on long-term anticoagulation and amiodarone.

DISCUSSION: Atrial flutter is characterized by a rapid atrial depolarization at a rate of approximately 300 bpm and a regular ventricular rate of about 150 bpm, when in its typical 2:1 AV nodal conduction pattern. The EKG shows absence of p waves with a sawtooth pattern in leads II, III, and aVF. The incidence increases markedly with age. In elderly patients, especially treated with beta-blockers such as ours, atrial flutter can present with a slower atrial rate and can also demonstrate a 1:1 conduction pattern across the AV node, which may be confused with sinus rhythm. Therefore, it is important to study the EKG closely in these patients in order to recognize underlying arrhythmias. The hemodynamic effect of atrial flutter on the left heart is an increase in the mean left atrial pressure, a reduction in the left ventricular end-diastolic pressure, with a subsequent decrease in systolic blood pressure, and increase in diastolic pressure. In patients with preexisting mitral disease and left ventricular remodeling, SAM and consequent worsening of left ventricular outflow tract (LVOT) obstruction frequently occurs with supraventricular arrhythmia. Furthermore, atrial flutter, regardless of the presence of SAM, can precipitate LVOT obstruction through decreased left ventricular filling and therefore decreased ventricular pressure otherwise necessary to counteract the outflow tract obstruction. Typical complaints include palpitations, fatigue, lightheadedness, and shortness of breath. Less frequently patients refer significant dyspnea, angina, hypotension, anxiety, presyncope. In patients with LVOT obstruction, for the above hemodynamic reasons, atrial flutter is poorly tolerated and is more likely to present with severe symptoms. As such, in elderly patients with history of mitral valve disease and LVOT obstruction, it is challenging yet vitally important to recognize atrial flutter, or any other supraventricular arrhythmias. Restoration and maintenance of sinus rhythm with cardioversion and antiarrhythmics is essential in this patient population in order to optimize cardiac function and minimize symptoms.

SNAP, CRACKLE, STROKE Christina Molumby; Jabraan Pasha. University of Oklahoma—Tulsa, Tulsa, OK. (Tracking ID #2157847)

LEARNING OBJECTIVE #1: Recognize vertebral artery dissection as a cause of stroke especially in patients younger than 45 years old.

LEARNING OBJECTIVE #2: Recognize neck manipulation, even self-manipulation, as a risk factor for vertebral artery dissection.

CASE: A 41-year-old female presented with a complaint of headache, nausea, vomiting, dizziness, and peripheral vision loss from her left eye since the day before admission. She stated that she had been "clumsy" and struggled to walk without falling. Vital signs were within normal limits. On physical exam, the patient had homonymous hemianopsia on the left. She had an ataxic gait and positive Romberg sign. There was no focal neurological deficit. Her initial CT scan of her head showed an infarction involving the right cerebellar hemisphere. CTA head and neck and MRI brain showed right vertebral artery dissection

from V2 to V3, right cerebellar infarction, right parietal infarction, and right occipital infarction. PT, PTT, and INR were all within normal limits. A hypercoagulability panel, including cardiolipin antibody and lupus anticoagulant, was all within normal limits. The patient had never had a chiropractic adjustment. However, she would routinely vigorously over-rotate her neck until she heard a "pop" sound. She admitted to doing this in both directions of rotation several times a day on a daily basis. She was discharged with high dose aspirin therapy, a statin, and Depakote for her headaches and was advised to stop twisting her neck.

DISCUSSION: The annual incidence of vertebral artery dissection is estimated to be between 1 and 1.5 per 100,000 and may account for 20 % of strokes in patients younger than 45.^{1,2} Many case reviews have been done in an attempt to determine causality between spinal manipulation and stroke. One such study that found that patients younger than 45 with vertebral artery dissection were 5 times more likely to have visited a chiropractor in the month before the incident compared to an age matched control group.³ Another case-controlled study concluded that spinal manipulation is independently associated with vertebral artery dissection.⁴ However, causality was never established. The incidence of spontaneous vertebral artery dissection is low. However, it is emerging as a cause of new onset strokes in patients under the age of 45. More study is needed to establish a causal relationship between spinal manipulation and dissection. Suspicion for vertebral artery dissection may be increased if the patient has a history of any neck manipulation. References 1. Redekop GJ. Extracranial carotid and vertebral artery dissection: a review. *Can J Neurol Sci.* 2008 May; 35(2): 146–52. 2. Rothwell DM, Bondy SJ, Williams JL. Chiropractic manipulation and stroke: a population-based case-control study. *Stroke.* 2001; 32: 1054–60. 3. Bertino, RE et al. Chiropractic Manipulation of the Neck and Cervical Artery Dissection. *Annals of Internal Medicine.* 2012; 157(2): 150–152. 4. Smith WS et al. Spinal manipulative therapy is an independent risk factor for vertebral artery dissection. *Neurology.* 2003; 60(9): 1424–1428.

SOFOSBUVIR INDUCED ANEMIA: AN IMPORTANT SIDE EFFECT OF A NOVEL HEPATITIS C MEDICATION Tina P. Kapadia; Alfred Burger. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2199197)

LEARNING OBJECTIVE #1: Review the adverse effects associated with a novel Hepatitis C medication, Solvadi (Sofosbuvir).

LEARNING OBJECTIVE #2: Emphasize the importance of medication reconciliation.

CASE: A 68 year old male with a history of AIDS (CD4 238 cells/mL in June 2014) on HAART, chronic Hepatitis C, Hepatitis B, COPD, CKD stage III, and active IV drug abuse presented with a chief complaint of generalized weakness of one month duration. His symptoms were associated with exertional dyspnea of the same duration. Review of systems was negative for fever, chills, chest pain, palpitations, syncope, orthopnea, lower extremity swelling, melena, BRBPR, or hematemesis. On admission, the patient was afebrile, tachycardic to 118, normotensive and saturating normally on room air. Physical exam was significant for a thin, elderly, chronically ill appearing male, with pale sclerae. Labs demonstrated a hemoglobin of 5.5 g/dL, MCV 96.3 fL, decreased from 11.1 g/dL 11 weeks prior to admission. Anemia work up revealed a negative FOBT, absolute reticulocyte index of 1 %, and normal B12, folate, iron and hemolytic studies, however these were obtained post-transfusion. Labs ordered to evaluate common viral causes showed Parvovirus B19 IgM 0.1, IgG 0.5, CMV PCR <200 copies/mL, and negative EBV heterophile Antibody screen. The patient's HIV Viral load was 55 copies/mL. Upon further investigation, the patient had recently been initiated on treatment for his chronic Hepatitis C. Collateral information from his primary care physician identified the regimen as a combination of Ribavirin and Solvadi (Sofosbuvir). With the assistance of hematology consult service, the patients drop in hemoglobin was attributed to the initiation of these medications. The patient required blood transfusions to improve his anemia and was advised to discontinue these medications.

DISCUSSION: We present here an interesting case of drug induced anemia from a novel Hepatitis C medication. Sofosbuvir (Solvadi) was recently approved for treatment of Hepatitis C in 2013. Since its approval, Sofosbuvir has been the point of much debate. Due to its cost, and the debate it has raised, this new, efficacious drug has likely been utilized less frequently than fully indicated. The current estimated prevalence of Hepatitis C is 1 % of the US population. Treatment of hepatitis can reduce morbidity and mortality from cirrhosis and hepatocellular carcinoma. Sofosbuvir will likely be more commonly included into treatment regimens in the near future. Functioning as an oral nucleotide analog, Solvadi inhibits the HCV RNA polymerase enzyme. The common side effects have not been widely discussed and encountered by many providers due to its slow adoption into clinical use. The most common adverse effects identified in clinical trials of patients who were on a regimen of Solvadi, Peg-Interferon, and Ribavirin were fatigue, headache, nausea, insomnia, and anemia. Approximately 20 % of patients experienced these side effects. Twenty-three percent of patients on this three drug combination had a change in hemoglobin to less than 10 g/dL, and 2 % of patients were noted to have hemoglobin of less than 8.5 g/dL. This was greater in the three drug combination, than in

drug regimens of Ribavirin and Peg-Interferon (14 and 2 % respectively), and Solvadi and Ribavirin (6 and 1 % respectively). Anemia is a common problem faced in the hospital setting and can require an extensive work up. This case reminds us that accurate medication reconciliation is a pivotal part of the clinical picture. High discrepancy rates in medication reconciliation are a well-known obstacle in the inpatient setting, and can play a significant role in preventing drug-disease and drug-drug interactions. This case shows the profound impact this new medication, initially absent from the patient's medication reconciliation, had on the diagnosis and treatment for this patient.

SPINAL EPIDURAL ABSCESS PRESENTING AS PARAPLEGIA AND DISSEMINATED SEPTIC ARTHRITIS IN AN IMMUNOCOMPETENT ADULT Jeremiah Stromich²; Adrian P. Umpierrez De Reguero¹; Pinky Jha³. ¹Froedtert & the Medical College of Wisconsin, Milwaukee, WI; ²Medical College of Wisconsin, Waukesha, WI; ³medical college of wisconsin, Milwaukee, WI. (Tracking ID #2198631)

LEARNING OBJECTIVE #1: Recognize an atypical presentation of a spinal epidural abscess (SEA)

LEARNING OBJECTIVE #2: Learn about the diagnosis and management of SEA

CASE: A 57 year old male with a past history of hepatitis C (treated with PEG-Interferon), hypertension, and gout presented with 1 week of bilateral hand edema, pain and erythema affecting multiple joints (right wrist, left first and second MCP, left shoulder and bilateral hips). He was initially treated by his PCP with Prednisone for a presumed gout flare. The ED drew blood cultures and consulted Orthopedic surgery for aspiration of the right wrist both of which later revealed Methicillin Sensitive *Staphylococcus Aureus* (MSSA). He denied any trauma, IV drug use, back pain and fevers. His initial neurological exam had no focal deficits. He was admitted and started on Vancomycin and Zosyn. The following day he underwent incision and drainage of his right wrist and left thumb IP joint. The third day of hospitalization, infectious disease was consulted and recommended a TEE and a WBC scan. The TEE was negative for valvular vegetations and the WBC scan showed increased uptake involving the right wrist and hip, left AC joint, elbow, thumb and ankle. On hospital day four, cultures grew MSSA and he was switched to Nafcillin. He developed lower extremity paralysis and hypoaesthesia as well as urinary retention which he felt began soon after admission. A spinal MRI with contrast demonstrated a T2 to T8 anterior SEA, L5 SEA, septic arthritis involving L4-L5 and L5-S1 facet joints, left psoas muscle abscess measuring 3.1×1.5 cm. Neurosurgery and Interventional Radiology were consulted but felt surgical intervention was not warranted given the extent, location and duration of the patient's symptoms. He developed complete paraplegia, urinary retention, bowel incontinence and drastically reduced sensation below his umbilicus. He later recalled a left hip injection 3 months ago as well as a history of lower back injections which he believes were facet joint. The patient was discharged to a long term acute care facility and follow up in Infectious Disease clinic 6 weeks after discharge revealed increased lower extremity sensation with some movement but continued inability to walk, urinary retention and bowel incontinence. A repeat MRI showed resolution of the T2-T8 SEA.

DISCUSSION: Here we report a case of MSSA SEA that progressed to paraplegia. SEA is a localized collection of pus between the dura mater and the vertebral column and the most common isolate is *S. aureus*. The classic triad presentation of SEA is back pain, fever and neurologic deficits but this triad occurs in about 13 % of patients which contributes a delay in diagnosis. Majority of cases will present with back pain (70–90 %) and fever (60–70 %); however our patient did not. Risk factors for SEA are impaired immune status, IV drug abuse, instrumentation of the spinal column and a source of infection. Numerous reports have demonstrated lumbar facet joint septic arthritis as a rare cause of SEA from local extension into the epidural space. The gold standard diagnostic test for a SEA is MRI with contrast but CT myelography can be substituted in centers without MRI or when MRI is contraindicated. Radionuclide studies have more sensitivity than radiographs but remain non-specific and carry a high false negative rate as seen in our patient. Studies suggest that the more chronic the infection and the use of antibiotics may contribute to a higher false negative rate. Given this less specificity and higher false negative rate, radionuclide scans are not recommended for routine use in diagnosing spinal infections. The treatment of choice is both surgical intervention with decompression and drainage of the SEA with antibiotics for at least 4–6 weeks. Empiric antibiotic coverage should include an anti-staphylococcal agent and aerobic gram negative bacilli (i.e. third generation cephalosporin or carbapenems). Blood and cultures from the SEA should be obtained, preferably before the initiation of antibiotics, but treatment should not be delayed in unstable patients. A delay in diagnosis can lead to a delay in treatment and the development of paraplegia, estimated at 34 % at time of presentation. The more severe or prolonged the neurological symptoms the poorer the prognosis. Surgery is not likely to be a therapeutic option in patients who have experienced paraplegia for longer than 36 h. The most severe complications of SEA include irreversible paralysis, which affects anywhere from 4 to 22 % of patients and mortality, estimated at 5 to 30 %. Given the

significant morbidity and mortality, SEA should be considered in any patient with acute onset neurological deficits.

SPINLED OUT OF CONTROL: A RARE, AGGRESSIVE FORM OF LUNG CANCER Randy Chung¹; Jeffrey T. Bates^{1, 2}. ¹Baylor College of Medicine, Houston, TX; ²Michael E. DeBakey VA Medical Center, Houston, TX. (Tracking ID #2191314)

LEARNING OBJECTIVE #1: Recognize pulmonary sarcomatoid tumor as a clinically aggressive subtype of non-small cell lung cancer.

LEARNING OBJECTIVE #2: Identify the clinicopathologic features of sarcomatoid carcinoma of the lung.

CASE: The patient is a 79-year-old man with a 40 pack-year smoking history who presented with progressive right hip pain. During the 2 months prior to his admission, he noted generalized fatigue, poor appetite, and an unintentional weight loss of 20 lb. Two weeks prior to admission, he began experiencing a constant pain in his right hip which radiated down his leg. He did not have fever, chills, low back pain, bladder incontinence, numbness or tingling. Physical examination was notable for diminished breath sounds over the left upper lung field and decreased strength of his right lower extremity secondary to pain. A chest x-ray showed a large left apical pleural-based mass. A subsequent computed tomography (CT) scan of the thorax revealed a 7.3-cm left upper lobe mass invading the chest wall. A biopsy confirmed a high-grade spindle cell neoplasm consistent with sarcomatoid carcinoma. A positron emission tomography (PET) scan showed metastatic lesions to the right iliac wing, ascending colon, and left supraclavicular lymph nodes. Given his poor functional status, the patient was deemed not to be a candidate for surgery or chemotherapy; he opted for palliative radiation therapy to his right hip.

DISCUSSION: Pulmonary sarcomatoid carcinoma (PSC) is a rare histologic subtype of non-small cell lung cancer (NSCLC), accounting for less than 1 % of all lung malignancies. PSCs are defined as poorly differentiated NSCLCs that contain a sarcomatous component or sarcoma-like element. Five subtypes are recognized by the World Health Organization: spindle cell carcinoma, giant cell carcinoma, pleomorphic carcinoma, carcinosarcoma, and pulmonary blastoma. The patients are usually male with a history of moderate to heavy tobacco consumption; mean age at diagnosis is between 65 and 75 years. PSCs commonly present as large (mean 7 cm) solitary peripheral masses with predilection for the upper lobes of the lung. Compared to other histologic subtypes, PSC behaves in an aggressive manner and tends to be a predictor of poor prognosis. In one retrospective study, the 5-year survival for PSC patients was 24.5 % compared with 46.3 % for NSCLC patients. Limited evidence currently exists supporting any particular treatment strategy. While surgical resection is likely associated with improved outcomes in early stage disease, several case series suggest high rates of resistance to conventional first-line chemotherapy.

STONES, BONES AND GROANS FOLLOWING COSMETIC SILICONE INJECTIONS Matthew Stuart. Montefiore Medical Center, New York, NY. (Tracking ID #2199289)

LEARNING OBJECTIVE #1: Understand the pathophysiology of hypercalcemia as a result of granulomatous disease

LEARNING OBJECTIVE #2: Review the anti-inflammatory effects of tetracyclines as an alternative to corticosteroids

CASE: A 38 year-old male to female transgender woman was admitted for 2 days of fever, nausea, malodorous urine and lower back pain. The patient has a history of chronic hypercalcemia, nephrolithiasis, recurrent urinary tract infections, and silicone injections to the buttocks and breasts. On exam, she had an ulceration of her right breast draining serosanguinous fluid, bibasilar rales, and two buttocks ulcers draining purulent fluid. Routine laboratory analysis revealed a hemoglobin of 11.6 g/dL, normal white blood cell count, calcium of 12.6 mg/dL, and albumin of 3 g/dL. Patient was found to have a slightly decreased parathyroid hormone (PTH) of 9 pg/mL, normal vitamin D 1,25 OH (calcitriol), decreased vitamin D 25-OH of 8 ng/mL, normal parathyroid hormone related protein, and elevated angiotensin converting enzyme of 98 U/L. CT of the pelvis revealed extensive and infiltrative granuloma formation in the buttocks and upper thighs from prior free silicone injections. Review of prior skin biopsies revealed areas of necrotic tissue with calcifications and acute inflammation. The patient had previously been treated with corticosteroids, however was unable to tolerate the steroids due to palpitations and tachycardia. The patient was treated instead with doxycycline.

DISCUSSION: Granulomas are a rare complication of silicone injections for cosmetic procedures. This is especially true in the transgender population. Multiple case reports have identified granulomatous reactions to free silicone injections, occasionally resulting in hypercalcemia. Although the pathophysiology of granuloma formation is unknown, it has been postulated that T-cell activation and release of cytokines, primarily tumor necrosis factor alpha, promote granuloma formation.

Hypercalcemia is a known complication of granulomatous disorders. In healthy patients, the conversion of vitamin D 25-OH to calcitriol is normally mediated by 1-hydroxylase in the proximal tubule of the kidney. This process is regulated by parathyroid hormone and the serum phosphate concentration. In patients with sarcoidosis and other granulomatous diseases, an elevated level of 1-hydroxylase has been demonstrated in activated macrophages. This results in an increased conversion of vitamin D 25-OH to calcitriol. Increased serum calcitriol results in increased intestinal absorption of calcium and in increased bone resorption. This process is independent of PTH regulation. Corticosteroids have been shown to inhibit the calcitriol synthesis by activated macrophages. However, due to our patient's inability to tolerate glucocorticoids, she was treated with doxycycline. The anti-inflammatory effects of tetracyclines have been studied in multiple cutaneous and autoimmune diseases and can be classified as indirect or direct. The indirect activity is based on the anti-bacterial effect of tetracyclines resulting in decreased neutrophil chemoattractants released by the bacteria. The direct effect is related to the ability of tetracyclines to inhibit leukocyte chemotaxis and to inhibit protein kinase C, which is believed to be a key enzyme involved in signal transduction and control of inflammation in granulomatous disease. It is important for physicians and patients to understand the unintended, unforeseen, long-term complications of elective cosmetic procedures. Further, larger randomized clinical trials are needed to evaluate the anti-inflammatory effects of tetracyclines in clinical practice.

STONES, BONES, GROANS, AND PSYCHIATRIC OVERTONES: TREATING A YOUNG PATIENT WITH HYPERCALCEMIA OF MALIGNANCY DUE TO METASTATIC EWING'S SARCOMA Farrell Tobolowsky. University of Texas at Houston, Houston, TX. (Tracking ID #2199724)

LEARNING OBJECTIVE #1: To recognize the poor prognosis in a cancer patient with hypercalcemia

LEARNING OBJECTIVE #2: To treat a patient with hypercalcemia of malignancy

CASE: C.H. is a 21 year-old male with a past medical history of Ewing's Sarcoma of the left thigh (diagnosed in 2012 with lung metastases) who presented from jail with shortness of breath, chest pain, back pain, and confusion. Patient stated that he was having these symptoms but was unable to communicate extensively. According to the nurse practitioner at the jail, patient was acting unusual that morning in the county jail clinic, and it was thought to be secondary to his pain medications. C.H. was then referred to the emergency department where he was found to be tachycardic to the 130's with a temperature of 100.5°, respiratory rate of 32, and oxygen saturation of 91 %. Patient refused a non-rebreather mask and was put on 6 l of oxygen. He was unable to give a full history and provide a complete review of systems. On physical exam, C.H. was found to be oriented to place and person, had bilateral crackles upon auscultation of the lungs, and a wound on the left upper thigh that appeared to have granulation tissue and minimal purulent drainage. Initial laboratory studies showed hypercalcemia with a calcium level of 16.8 and a creatinine of 2.9 (baseline of 0.8). Intact parathyroid hormone was low at 5.3. Leukocyte count was within normal limits. However, due to the patient's fever and altered mental status, he was commenced on broad spectrum antibiotics for possible hospital acquired pneumonia. Treatment of hypercalcemia was commenced with normal saline, calcitonin, and pamidronate. CT abdomen/pelvis showed new metastases to the liver, spine, pelvis, and ribs as well as increased lung metastases. The patient received multiple packed red blood cell transfusions as the metastases were hemorrhagic. Blood and urine cultures continued to remain negative for growth. Antibiotics were eventually discontinued once infection was deemed unlikely. After having a goals of care discussion with the patient and the palliative care team, comfort measures were initiated, and the patient passed away 12 days after admission.

DISCUSSION: C.H. presented with many of the typical symptoms of hypercalcemia such as bone pain, confusion, lethargy, and abdominal pain, which are usually seen with a calcium above 12 mg/dl. Severe hypercalcemia is classified as a value above 15–16 mg/dl. If a patient who has cancer presents with elevated calcium, it signifies a very poor prognosis, and approximately 50 % of these patients die within 30 days. This is correlated to advanced tumor burden in an individual and occurs in 20 to 30 % of patients with cancer during the course of their disease. Further, the patient's hypoxia on presentation can be explained by his extensive lung metastases, and the patient's acute renal failure is most likely due to calcium deposition in the kidneys. As the patient's intact parathyroid hormone was found to be low, the increased calcium was most likely due to malignancy rather than primary hyperparathyroidism. Hypercalcemia associated with cancer can be due to four different mechanisms. Most commonly, humoral hypercalcemia can occur due to systemic secretion of PTHrP, which causes increased bone resorption and the kidney to retain more calcium. The other mechanisms include: local osteolytic hypercalcemia from bone resorption in areas near the malignant cells in the marrow (likely in our case), secretion of an active form of vitamin D by lymphomas, and rarely, ectopic parathyroid hormone produced by tumors to cause release of bone calcium. Osteolysis is likely in our

case as the tumor has metastasized further to bone, and PTHrP secretion is less common in a primary Ewing's Sarcoma. Regardless of the mechanism, the current literature illustrates that the treatment of hypercalcemia of malignancy is with intravenous fluids, calcitonin, bisphosphonates, steroids, and in some cases, loop diuretics. Calcitonin acts the most rapidly; however, it is only effective for 2–3 days. Bisphosphonates may take days to work, yet the effects can last weeks to months. Fluids should be utilized at a rate of 200 to 500 cc/hour and act immediately to increase calcium excretion from the kidney. Loop diuretics should not be utilized in patients with severe metabolic derangements or until rehydration is achieved. These treatments help to decrease the calcium to normal limits for 1 to 3 weeks while treatment is initiated for the cancer. In C.H.'s case, the calcium returned to normal with treatment, yet the cancer was already metastatic and hemorrhagic throughout the body; therefore, the mainstay of treatment became palliative. Recognizing that hypercalcemia was indicative of advanced disease, even in a cancer with a typical survival rate of over 50 %, led the team to obtain further imaging in order to realize the poor prognosis of this young patient.

STOWAWAY: SCHISTOSOMIASIS AS A RARE CAUSE OF CHRONIC DIARRHEA IN THE UNITED STATES Yihan Yang²; Tao Liu²; Sheldon Campbell¹; Abhay J. Dhond². ¹Yale School of Medicine, New Haven, CT; ²YNHH, New Haven, CT. (Tracking ID #2194139)

LEARNING OBJECTIVE #1: Evaluate patients with chronic diarrhea

LEARNING OBJECTIVE #2: Recognize and manage patients with schistosomiasis

CASE: A 30 year old male immigrant from Brazil without travel since 2003 presented with a 1.5 year history of diarrhea. The diarrhea initially occurred ten times a day but had decreased to five times daily at presentation. Bowel movements were watery with occasional blood, associated with lower abdominal cramping. His diarrhea and abdominal pain were not related to oral intake. He denied any fevers, chills, night sweats, weight loss, decreased appetite, oral ulcers, nausea, vomiting, joint or muscle aches, rash, recent travel or hiking, or any antibiotic exposure prior to onset of diarrhea. He had no significant medical or surgical history and was not on any medications. Family history was significant for a paternal grandfather with unknown GI cancer in his 50s. He had a ten pack-year smoking history and occasional marijuana use. He denied alcohol use or IVDU. Currently unemployed, he previously worked in construction. On exam he was afebrile, BP 101/63, HR 62. He had no oral lesions and his heart and lung exam was normal. His abdomen was notable for mild tenderness to palpation in the lower quadrants bilaterally with hyperactive bowel sounds but no organomegaly. A rectal exam revealed brown, guaiac negative stool. There was no lymphadenopathy. Laboratory testing revealed normal chemistries, mild normocytic anemia of chronic inflammation, no eosinophilia, normal LFTs, amylase, lipase and TSH negative stool culture, ova and parasites, fecal leukocytes, transglutaminase IgA, *C. difficile* antigen, HIV, and Quantiferon Gold positive FOBT and minimally elevated ESR of 21. CT abdomen and pelvis 7 months prior to presentation showed no colitis or other abnormalities. Repeat O&P was negative. Given history of bloody diarrhea with positive FOBT, anemia, and ongoing diarrhea, he was referred for colonoscopy. Two nodules were found within the sigmoid colon and biopsied. Pathology revealed colonic schistosomiasis with surrounding eosinophilic colitis. Testing for concomitant *Strongyloides* infection was negative. He was treated with Praziquantel 40 mg/kg divided into two doses. His diarrhea and abdominal pain resolved completely.

DISCUSSION: Chronic diarrhea is defined as the presence of loose stools for greater than 4 weeks. Common causes in the United States include lactose intolerance, celiac disease, inflammatory bowel disease, irritable bowel syndrome and chronic infections. Assessment of the history should include diarrhea characteristics, associated symptoms, and exposures to help narrow the differential into three classic categories: watery (secretory or osmotic), inflammatory, or fatty. Laboratory tests should include serum electrolytes, CBC with differential, thyroid and liver function studies, fecal occult blood, fecal leukocytes/lactoferrin/calprotectin, ova and parasites, ESR, CRP, and antitissue transglutaminase IgA. Inconclusive diagnosis, weight loss, bloody diarrhea or persistent diarrhea despite therapy should prompt endoscopic evaluation. Pertinent features of this case included the patient's emigration from Brazil 11 years prior, bloody diarrhea, abdominal pain unassociated with food intake, presence of anemia and mildly elevated ESR concerning for inflammatory or chronic infectious etiology. While schistosomiasis is common in the patient's native country of Brazil, we found only eight published reports of colonic schistosomiasis in the US on PubMed search. Schistosomiasis is a helminthic parasitic disease affecting an estimated 200 million people worldwide with high morbidity and mortality in Sub-Saharan Africa, Southeast Asia, and South America. Acute infection can present with fevers, chills, myalgia, abdominal pain, diarrhea, and hepatosplenomegaly. Chronic infection can cause portal hypertension, splenomegaly, colonic polyps with bloody diarrhea, pulmonary hypertension and glomerulonephritis. Diagnosis can be made through stool O&P, serology, or tissue biopsy. Praziquantel 40–60 mg/kg taken in divided doses over 1 day is first line therapy. Our patient was atypical as his symptoms began eleven years after possible exposure in Brazil, and he lacked "classic" positive O&P and

elevated eosinophils, likely due to a low parasite burden. This case demonstrates that long-lived infections, like schistosomiasis, should remain on the differential for patients with chronic diarrhea and remote travel to or from endemic areas.

SUBMUCOSAL LESIONS PRESENTING WITH RECTAL BLEEDING—ENDOMETRIOSIS IN THE GASTROINTESTINAL TRACT

Fahd Jowhari¹; Pearl Behl²; Sean Pritchett³. ¹Queen's University, Kingston, ON, Canada; ²University of Toronto, Toronto, ON, Canada; ³Belleville General Hospital, Belleville, ON, Canada. (Tracking ID #2196515)

LEARNING OBJECTIVE #1: Recognize intestinal endometriosis as an important cause of rectal bleeding in the adult female.

LEARNING OBJECTIVE #2: Include intestinal endometriosis in the differential for undiagnosed sub-mucosal lesions in the adult female's GI tract.

CASE: A 46-year-old female presented with a 4-week history of irregular bowel movements and hematochezia. There was no associated abdominal pain, nausea/vomiting, hematemesis, coffee ground emesis, or melena. There were no fevers, chills, weight loss (some weight gain), history of travel or sick contacts. Family history was negative for colon cancer, celiac disease or Inflammatory Bowel Disease (IBD). Her past medical history was unremarkable with no prior surgeries or endoscopies/colonoscopies. She was on no medications. She had been a lifelong non-smoker and non-drinker and had no drug allergies. Examination was unremarkable with no palpable masses or areas of tenderness in the abdomen. DRE was unremarkable. Basic laboratory investigations and inflammatory markers were all normal. With non-contributory labwork and physical exam findings, an elective colonoscopy was performed. Two large submucosal lesions were found (30 cm & 40 cm from the rectum) and appearances were most in keeping with GIST tumors. Deep biopsies were taken and pathologies revealed normal colonic mucosa, muscularis mucosa and superficial submucosa, with no neoplastic spindle cell lesions present. CT imaging of the abdomen/pelvis was unremarkable & the submucosal lesions could not be seen on imaging. Given the persistence of symptoms & focally identified lesions on colonoscopy, our patient underwent a repeat colonoscopy for landmarking of the submucosal lesions, and a subsequent left hemi-colectomy & end anastomosis for resection of lesions. Pathologies from the resected specimen interestingly revealed extensive endometriosis characterized by variably sized columnar-lined glands cuffed by endometrial-type stroma, extending from the sub-mucosa to the mesentery. The diagnosis was supported by immunohistochemistry (positive ER immunostain with CD10 reactivity). The appendix (resected) also showed evidence of endometriosis, and the anastomotic margins were histologically normal. The patient did very well post-operatively. Her bowel movements became regular and formed, with no evidence of further lower GI bleeds.

DISCUSSION: Endometriosis occurs in 6 to 10 % of the general female population. Its presence in the GI tract has been reported in several case reports with the sigmoid colon and rectum being the two most common sites, followed by the ileum, ileocecal area, appendix & anterior rectal wall. Establishing a diagnosis of intestinal endometriosis is often a diagnostic challenge as none of its symptoms are pathognomonic, and even though the symptoms should physiologically be worse cyclically with menses, this is not always the case. The disease is primarily diagnosed in premenopausal women, but can also occur in postmenopausal women as endometrial implants may cause a fibrotic reaction in the muscle of the affected bowel wall even after cessation of ovarian function. Presenting symptoms are often non-specific and may include unexplained digestive problems, tenesmus, per-rectal bleeding, bloating, constipation, diarrhea, and pain. Pain can be epigastric, abdominal, pelvic or rectal with the symptoms varying depending on the location, depth of invasion, adnexal adhesions, and the presence of a consequential partial or complete bowel obstruction. Endoscopic diagnosis of intestinal endometriosis is challenging, as most lesions do not infiltrate the gastrointestinal mucosa; and therefore radiological modalities such as CT scans, MRI or trans-vaginal ultrasonography may be helpful in diagnosis. Luminal findings suggestive of endometriosis range from eccentric wall thickenings, polypoid lesions, endometrioid heterotopias of the mucosa, and gross surface nodularities/ulcerations. Rates of histological confirmation of the diagnosis seem to be highest in cases with surface nodularities, with inconclusive results seen in most other cases. Management involves symptom control and maintaining fertility. This is achieved primarily from surgical resection of all visible endometriosis (via laparoscopic bowel resection, or segmental bowel resection depending on disease extent). Hormonal therapies may improve symptoms in the short term but they do not improve fertility. In summary, the diagnosis of intestinal endometriosis can be challenging. However, it is prudent to consider this in the differential diagnosis of sub-mucosal GI lesions, especially in a premenopausal patient presenting with vague abdominal symptoms including pain, irregular bowel movements or bleeding from the GI tract. Cyclical bowel symptoms with menstruation, along with historical evidence of menometrorrhagia, infertility and dyspareunia should point one in the direction of intestinal seeding; however, the absence of these should not deter one from considering the diagnosis.

SUGAR RUSH: KETOSIS PRONE DIABETES Lika E. Targan; Marie Brubacher. Beth Israel Deaconess Medical Center, Boston, MA. (Tracking ID #2196611)

LEARNING OBJECTIVE #1: Recognize the presentation and epidemiology of ketosis prone diabetes

LEARNING OBJECTIVE #2: Review the management of ketosis prone diabetes

CASE: A 52 year old African American gentleman with no known medical problems presented to the ICU after being found unconscious in his home. Laboratory analysis revealed pH 7.05, bicarbonate 10, anion gap of 30, blood sugar >1500, and ketonuria. He was treated for diabetic ketoacidosis (DKA) per hospital protocol. His anion gap closed, his mental status improved, and he was switched to a long acting insulin regimen once he was able to tolerate PO intake.

DISCUSSION: The diabetes categories we commonly know classify diabetes as Type I or Type II. Type I diabetic patients have autoimmune destruction of pancreatic beta cells, require life-long insulin therapy, and are prone to develop DKA. Patients with Type II diabetes develop insulin resistance, but are generally not considered to be at risk for DKA. However, there is a group of patients who present with DKA, but do not require long-term insulin therapy. These patients fall into the group called Ketosis Prone Diabetes (KPD). KPD is classically a syndrome of obesity, unprovoked ketoacidosis, reversible β -cell dysfunction, and near-normoglycemic remission. The underlying mechanism for beta cell dysfunction in this group not well defined. KPD is most common among African Americans and Hispanics. These patients with KPD have clinical features of Type II diabetes: They are obese, have a strong family history of diabetes, a low prevalence of autoimmune markers, and no association with HLA. Intense management with insulin results in an improvement in beta cell function and many patients are ultimately able to discontinue insulin therapy. The system of classification that most accurately predicts the need for insulin treatment 12 months after presentation with DKA is known as the A β system. This system classifies diabetics into 4 groups: 1) A+ β -: Autoantibodies present, beta cell function absent. 2) A+ β +: Autoantibodies present, beta cell function present. 3) A- β -: Autoantibodies absent, beta cell function absent. 4) A- β +: Autoantibodies absent, beta cell function present. A- β patients are the largest KPD subgroup and most commonly present with DKA, yet clinically behave as type II diabetes. Management requires the immediate treatment of DKA and subsequent close outpatient follow up for monitoring and assessment of the ability to discontinue insulin or intensify therapy. The natural history of KPD after the initial episode of DKA depends upon the presence of autoantibodies and beta cell reserve. Beta cell reserve is the key determinant of long-term glycemic control and dependence. Patients should be discharged on insulin therapy, regardless of the presumed phenotype of the KPD. Ultimately, assessment of beta cell reserve and autoimmunity, by measuring C-peptide levels and presence of antibodies, can help predict the clinical course. In clinical practice it is not always feasible to accurately assess beta cell functional reserve and beta cell autoantibodies based on cost restraints and assay availability. In general practice, the insulin dose can be gradually reduced, if ultimately possible, with monitoring of serum glucose and serum and urine ketones.

SUPERIOR MESENTERIC ARTERY SYNDROME: AN ACUTE ANGLE CAUSING CHRONIC ABDOMINAL PAIN Oluwaseun Shogbesan; Anene Ukaigwe; Adetokunbo F. Oluwasanjo; Anthony Donato. Reading Health System, West Reading, PA. (Tracking ID #2196282)

LEARNING OBJECTIVE #1: Recognize the role of angiography in evaluating chronic postprandial pain

LEARNING OBJECTIVE #2: Recognize the key clinical features of Superior Mesenteric Artery syndrome

CASE: A 44-year-old woman presented to her primary care office with a 3-year history of moderate to severe postprandial abdominal pain associated with nausea, post prandial vomiting, anorexia and 60-lb weight loss. Weight loss preceded the onset of abdominal pain, but then became progressive and unintentional. Significant past medical history included multiple abdominal surgeries, migraine headaches, depression and anxiety disorder. Physical examination revealed a hemodynamically stable but thin woman with body mass index of 19 kg/m². Abdominal and other examinations were unremarkable. Laboratory tests, including liver functions, electrolytes, creatinine, TSH, complete blood count were normal. Ultrasonography revealed a previous cholecystectomy and no hepatic or pancreatic lesions. Computed tomography scan of the abdomen and pelvis excluded mass lesions and obstruction. Esophagogastroduodenoscopy with biopsy showed esophagitis, and chronic active H. pylori gastritis. Her duodenum was grossly and microscopically normal. Colonoscopy was unremarkable. She completed triple H. pylori antibiotic therapy. Given her psychiatric history, the possibility of an eating disorder was explored and she was referred for psychiatric evaluation. A CTA of the abdomen and pelvis ordered to evaluate for a possible vascular etiology showed an aortomesenteric distance of 5.5 mm (Normal: 10 mm-28 mm), and aortomesenteric angle of 12° (Normal: 33-65°). Mild

distention of the proximal duodenum to 31 mm was also noted with compression of the distal portion of the duodenum to a diameter of 14 mm (Normal: 24 mm). A diagnosis of Superior Mesentery Artery (SMA) syndrome was made and she was referred to surgery for further management. She is presently being evaluated for a duodenojejunostomy bypass

DISCUSSION: Chronic abdominal pain is an extremely common complaint in the primary care setting. Although often functional, high value, cost-conscious care supports recognizing the key clinical features of abdominal pain due to vascular anomalies and the clinical presentations in which the use of Computed Tomography Angiography (CTA) is appropriate. Chronic postprandial abdominal pain can result from anatomical distortion of the superior mesenteric artery as seen in Superior Mesentery Artery (SMA) syndrome. SMA syndrome is characterized by postprandial epigastric pain, nausea and vomiting that relieves the pain, and weight loss which further aggravates the condition. This syndrome should be considered in patients with significant weight loss presenting with acute or chronic proximal bowel obstruction, especially when an extensive workup is otherwise negative. A CT scan may show signs of bowel obstruction, but in some cases like ours, it may be normal. The demonstration of an aortomesenteric angle less than 25° and an aortomesenteric distance less than 8 mm, with compression of the distal duodenum on CTA supports the diagnosis of SMA syndrome. Gaining lost weight is recommended; surgical procedures to correct anatomic obstruction are often indicated.

SYNCOPE IN THE YOUNG AND HEALTHY: A CASE REVISITED Camille Clarke. ¹Cambridge Health Alliance, Cambridge, MA; ²Harvard Medical School, Boston, MA. (Tracking ID #2199119)

LEARNING OBJECTIVE #1: Appreciate syncope in the presentation of pulmonary embolism

LEARNING OBJECTIVE #2: Review the pathophysiology of syncope in pulmonary embolism and clinical clues that can help distinguish these presentations from other less fatal etiologies

CASE: A 30 year old Caucasian female with no known medical history presented following two syncopal episodes. She felt lightheaded while walking then lost consciousness and fell twice. She admitted to not eating since the prior evening but denied any symptoms during the episode and was in her normal state of health. She formerly smoked but quit 8 years before and denied any alcohol or drug use. Her family history was significant for fainting episodes in her father and her only medication was oral contraceptives. On presentation her vital signs were normal. Physical exam revealed a normal cardiac and neurological examination with some transient light-headedness when changing position. Initial workup showed normal urinalysis, complete blood count, cortisol, prolactin, vitamin B12 and thyroid levels. She had mild hyponatremia on basic metabolic panel but a clear chest x-ray and normal EKG. On the night of admission, she reported feeling dizzy while ambulating to the bathroom and was noted to be tachycardic on telemetry. She denied any other symptoms during this episode. Morning vitals were unremarkable and physical examination near identical except for a split S2 murmur in her left upper sternal border. Repeat EKG revealed new T wave inversions in leads 3, V1-3, so ECHOCardiogram was obtained which showed a normal ejection fraction but severely enlarged left ventricle and elevation of the right ventricular systolic pressure. Troponin and BNP levels were obtained and elevated. Emergent computed tomography pulmonary angiography revealed large obstruction in the distal main pulmonary segment of right and left main pulmonary arteries causing right ventricular strain for which she underwent successful thrombolysis.

DISCUSSION: Pulmonary embolism is a frequent cause of death with wide clinical variations. Obstruction of the branches of the pulmonary trunk precipitates severe hypoxia and obstruction of this blood flow to the lungs can cause dyspnea, hemoptysis and pleuritic pain. This classic triad however, is rare, and several cases of pulmonary embolism discovered on autopsy were unsuspected before death. Syncope, though a common presenting complaint, can be an important symptom of this fatal event. It is often a result of impaired filling and reduced cerebral flow perfusion secondary to right heart failure from acute obstruction. Cardiac biomarkers can be used as a prognostic factor for patients with pulmonary embolism. Transient changes can be seen on EKG with classic S1Q3T3 pattern or T wave inversions in leads V1-3. In the case of our patient, her troponin and BNP were elevated demonstrating significant left ventricular dysfunction with acute right ventricular overload and there were marked variations of her EKG pattern. Though she did not have alarming risk factors and subsequent hypercoagulable studies were negative timely identification of this condition was imperative. With unexplained or 'idiopathic' presentations of syncope pulmonary embolism should be suspected as prompt diagnosis and treatment can be life-saving.

SYSTEMIC ALLERGIC REACTION TO INSULIN LISPRO IN AN INSULIN NAIVE TYPE 2 DIABETES PATIENT Divya Akshintala²; Manajyoti Yadav¹. ¹University of Illinois College of Medicine, Peoria, IL; ²University of Illinois College of Medicine at Peoria, Peoria, IL. (Tracking ID #2191341)

LEARNING OBJECTIVE #1: Recognize the potential for allergic reactions to recombinant human insulin

LEARNING OBJECTIVE #2: Consider other forms of insulin in such patients as hypersensitivity to one type does not preclude the use of other types of insulin

CASE: A 43-year-old male presented to the ED with confusion, abdominal pain, nausea and vomiting. Patient reported one month history of generalized weakness, polyuria and poor vision. He had no significant past medical history. His father had diabetes. Physical examination revealed tachycardia. Patient was lethargic, but oriented. Abdominal exam was remarkable for diffuse tenderness. All other systems were within normal limits. Initial laboratory studies were consistent with hemoconcentration and leukocytosis. The anion gap was high and ketones were detected in urine. Blood glucose level was markedly elevated. A diagnosis of diabetic ketoacidosis was made and an insulin drip and crystalloid infusion was started. With above management the ketoacidosis resolved over time. Patient was then started on a regimen of basal insulin glargine and mealtime insulin lispro. With the first few doses of insulin lispro patient started having generalized itching and skin flare reactions all over his body. He also had lip and palate swelling, without any respiratory distress. These symptoms were noted serially just after the insulin lispro injections. Insulin lispro was held, and the patient was treated symptomatically. Patient's symptoms dramatically improved after stopping insulin lispro. The expert opinion of an endocrinologist was sought. Patient was given NPH insulin and he did not have any further similar reactions. He was discharged home with no symptoms, on NPH insulin.

DISCUSSION: This case illustrates the potential for systemic type I hypersensitivity reactions with the use of insulin lispro and the importance of early clinical identification of the reaction. Although such reactions to different types of insulin are rare (Insulin Lispro ~ 1 %), they are predictable. The reaction can be in response to insulin itself, or to the various components in the mixture such as zinc, protamin and preservatives such as phenol or glycerol. Hypersensitivity to one type of insulin does not preclude the use of other types. Other forms of insulin must be considered and may provide successful treatment options in situations where insulin use is warranted.

TAKE TWO! AN UNEXPECTEDLY AGGRESSIVE COAGULASE NEGATIVE STAPHYLOCOCCUS Jien Shim; Rachel Solomon; Lindsay Gottlieb. Mount Sinai Medical Center, New York, NY. (Tracking ID #2196150)

LEARNING OBJECTIVE #1: Recognize *Staphylococcus lugdunensis* as a virulent species causing native valve endocarditis

LEARNING OBJECTIVE #2: Identify signs and symptoms of endocarditis in a young, healthy patient presenting in an ambulatory setting

CASE: A 31 year-old woman presented to resident clinic with progressive fatigue and myalgias for one month. Prior to the onset of symptoms, she had been very active working as a college instructor and running five miles daily. Her function had become increasingly limited by anorexia, weakness, fevers, chills, myalgias, and right hip pain. Her medical history included anemia and a heart murmur since childhood. She denied intravenous drug use. In clinic, she was well appearing and afebrile, with a blood pressure of 86/62 mm Hg, heart rate 104 beats-per-minute, and a 2/6 systolic ejection murmur loudest at the apex. Labs revealed hemoglobin of 8.5 g/dL, leukocytosis to 18,400/uL (86 % neutrophils), thrombocytosis to 696,000/uL, Erythrocyte Sedimentation Rate 99 mm/hr, and C-Reactive Protein (CRP) 36.3 mg/L. The patient was called in for follow-up but did not come. One month later, she returned unable to stand or ambulate due to pain in her right hip and profound weakness. On transfer to the hospital for admission, labs showed persistent leukocytosis, anemia and CRP 108 mg/L. Transesophageal echocardiogram revealed rheumatic heart disease, severe mitral regurgitation, and a moderately sized mitral valve vegetation. Blood cultures grew coagulase-negative staphylococcus within 15 h of incubation, confirming a diagnosis of infective endocarditis. CT pelvis and MRI of the brain later revealed multiple embolic foci including a 6 cm right external iliac artery thrombus, left-sided parietal lobe infarcts, and a mycotic aneurysm of the left MCA. On hospital day two, cultures speciated *Staphylococcus lugdunensis*.

DISCUSSION: *Staphylococcus lugdunensis* is a coagulase negative species that was first described in 1988. Although it is only responsible for about 1 % of cases of infective endocarditis (IE), it is aggressive in its course and associated with high rates of embolic complications and mortality. Notably, as in our patient, *S. lugdunensis* IE most commonly involves native valves (77 % of known cases) and usually causes left-sided infections (particularly mitral valves). *S. lugdunensis* is commonly found on human skin and is rarely a contaminant in cultures. In most patients, infections are community acquired and in many, as in ours, the site of entry remains undetermined. Importantly, *S. lugdunensis* (unlike other coagulase-negative *Staphylococcus* species (CoNS) which typically cause more indolent presentations of IE characterized by low rates of complications and mortality) is noted to behave similarly to *S. aureus* in its pathogenicity and mortality rates. Specifically, high rates of valve destruction, abscess formation, acute heart failure, and peripheral emboli yield overall mortality rates as high as 50–70 % (vs. 16 % in IE

caused by other CoNS). More recent studies, however, suggest that early surgical intervention and appropriate antibiotic therapy are associated with mortality rates closer to 20 %. Given the aggressive course and high mortality rates associated with *S. lugdunensis* IE in patients with native valves, physicians must maintain a high index of suspicion and CoNS in culture must be taken seriously. Our patient presented with nonspecific systemic symptoms, heart murmur, and elevated inflammatory markers. Blood cultures were not drawn. A 1 month delay in her diagnosis allowed for valvular destruction requiring open heart surgery for mitral valve repair and propagation of septic emboli causing stroke, thromboembolism, and mycotic aneurysm formation. Following a 3 week hospital-stay, she returned home to complete an 8-week course of nafcillin-rifampin. Her mycotic aneurysm remains under surveillance and she is slowly recovering strength.

TAKING NOTE OF THE LYMPH NODES Marce E. Abare; Darlene LeFrancois. Montefiore Medical Center, Bronx, NY. (Tracking ID #2199307)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations and epidemiology of AIDS-related lymphomas

LEARNING OBJECTIVE #2: Formulate an appropriate differential and diagnose the etiology of hypotension in an immunocompromised patient

CASE: A 54 year-old woman with AIDS reported a month of worsening fatigue and weight loss (documented 15 lbs in 1 month). She had developed sternal dysphagia and odynophagia to solids, increasing anorexia, and intermittent diarrhea. Her history was notable for inconsistent adherence to HAART, HCV cirrhosis Childs class B, hypertension on 3 oral agents, and active polysubstance use. On physical exam, she was oriented but lethargic, falling asleep mid-sentence. She was febrile at 101.0 and hypotensive to 63/37 (BP 1 month prior 80/49). The extremities were cool with equal distal pulses; lungs clear; the abdomen soft with 5 cm mildly tender splenomegaly and no fluid wave; neurologic exam nonfocal. There was normal cardiac function on bedside ultrasound. Labs revealed LDH 167 (100–190), CD4 77/14 % (prior nadir 167 1.5 years prior, 255 4 months earlier), WBC 8.5, Hgb 8.7 g/dl, BUN/Cr 27/2.1, albumin 2.1, lactic acid 3.8 (0.6–2.2). CT abdomen revealed a cirrhotic liver and retroperitoneal lymphadenopathy measuring 3.6×2.4 cm. Due to persistent hypotension despite IV hydration, she was admitted and received a short course of pressors, dexamethasone, and antibiotics. An infectious workup was negative. Random cortisol and response to ACTH were normal. Esophageal candida was identified on endoscopy; dysphagia improved with treatment. After further fluid repletion BP stabilized but fever persisted. On hospital day 7, diffuse large B-cell lymphoma was found on biopsy of a retroperitoneal lymph node. The patient was treated as an outpatient with 2 cycles of reduced dose R-CHOP for stage III C-MYC positive DLBCL but expired just prior to cycle 3 for unknown reasons.

DISCUSSION: Hypotension among immune compromised patients is a commonly encountered clinical problem with a wide differential, often leading to intensive investigation and broad empiric therapies. Among patients exhibiting signs of end-organ dysfunction—altered mental status, metabolic acidosis, oliguria—distinguishing among hypovolemic, cardiogenic and distributive types of shock and identifying their underlying cause must happen in concert with resuscitation. In our case, hypovolemia emerged as a leading etiology in light of the subacute to chronic symptomatology (anorexia, dysphagia, diarrhea, fever) that resulted in decreased oral intake and increased GI and insensible losses. Her underlying chronic conditions (cirrhosis, malignancy, and HIV) also yielded poor intravascular retention of fluids and reduction in vascular resistance. Furthermore, prior failure to modify her anti-hypertensive regimen in the ambulatory setting caused a significant component of iatrogenic hypotension. Our findings did not substantiate other diagnostic hypotheses including sepsis, endocrine dysfunction, or cardiac pump failure, allowing prompt discontinuation of inappropriate therapies and targeted treatment of her underlying conditions, including candida esophagitis and DLBCL. Our patient's history was most striking for its indolent progression and the presence of classic B symptoms, defined as fever >38 degrees C, unintentional weight loss >10 % over 6 months, and drenching night sweats. Due to impaired cellular immunity, HIV positive patients are predisposed to developing malignancy. Overall, 25–40 % of HIV infected individuals will be diagnosed with cancer in their lifetimes, 10 % of which are non-Hodgkin's lymphoma (NHL). Because the clinical presentation of AIDS-related lymphoma is variable, the internist must maintain a high level of suspicion. In a recent case series of HIV infected patients with fever of unknown origin, NHL was the underlying cause in 6 to 14 % of cases. Compared to disease in the seronegative population, AIDS-related lymphoma presents with more frequent B symptoms, more advanced disease (stage III or IV), aggressive subtypes (DLBCL, lymphoblastic or Burkitt's), and extranodal involvement commonly affecting the GI tract, bone marrow, and liver, although any site can be involved. In addition to constitutional symptoms patients may exhibit painless adenopathy, a variety of minor biochemical and hematologic abnormalities (unexplained anemia, leukopenia, thrombocytopenia), and hyperuricemia. As many as half of cases of NHL present with elevated LDH. Diagnosis requires biopsy of nodal

tissue. Therapy strategies include chemotherapy, immunotherapy and HAART. Our patient's profound hypotension was a result of fluid loss from the combined effects of multiple chronic conditions including occult malignancy—a diagnosis uncovered after initial diagnostic and therapeutic maneuvers failed to explain the fever or account for the adenopathy. The case illustrates that in patients with advanced HIV presenting with nonspecific systemic symptoms, AIDS-related lymphoma must be investigated.

TAKOTSUBO CARDIOMYOPATHY ASSOCIATED WITH SPONTANEOUS PNEUMOTHORAX Shawn Potteiger; Paras Karmacharya. Reading Health System, Reading, PA. (Tracking ID #2200126)

LEARNING OBJECTIVE #1: Recognize spontaneous pneumothorax as a cause of Takotsubo cardiomyopathy.

LEARNING OBJECTIVE #2: Differentiate Takotsubo cardiomyopathy from acute coronary syndrome (ACS) as these have different management.

CASE: An 80 year-old male presented to the emergency department with sudden onset left sided chest pain, shortness of breath and diaphoresis. On physical examination, the patient was afebrile and tachypneic. There were decreased breath sounds on auscultation of the left lung field. Chest radiograph revealed a large left-sided tension pneumothorax with mediastinal shift to the right side. EKG showed non-specific ST segment changes with an initial troponin I of 0.16 ng/mL (normal <0.01). Emergent chest tube placement was performed with improvement of symptoms. Serial troponins were drawn with an increase of troponin I to 2.58 ng/mL. Transthoracic echocardiogram demonstrated new left ventricular dysfunction with an ejection fraction of 33 %. Subsequent cardiac catheterization revealed no significant stenosis, and left ventriculography revealed apical ballooning and akinesis. His condition rapidly improved over the next 2 days and he was discharged home.

DISCUSSION: Takotsubo cardiomyopathy, also known as “broken heart syndrome”, is an uncommon mimicker of acute coronary syndrome (ACS) characterized by EKG changes and positive cardiac biomarkers without evidence of coronary artery stenosis on cardiac catheterization. It has classically been described occurring after intense emotional stress. However, it has also been reported to be associated with several clinical problems, such as subarachnoid hemorrhage, pheochromocytoma and Guillain-Barre syndrome. Although the exact mechanism of ventricular dysfunction is unclear, coronary spasm and catecholamine cardiotoxicity have been implicated. Our case demonstrates an unconventional presentation of takotsubo cardiomyopathy precipitated by a spontaneous pneumothorax which has rarely been described in the literature. ST segment changes persisted even after resolution of pneumothorax and coronary angiography did not reveal any coronary spasm. We suggest that left ventricular dysfunction in our patient was induced by altered catecholamine levels (elevated plasma noradrenaline) caused by the sudden underlying stress of spontaneous pneumothorax acting as an underlying stressor. Furthermore, recognition of this condition was important as the treatment and prognosis (95 % with complete recovery in 4–8 weeks) completely differ from ACS.

TB OR NOT TB, THAT IS THE QUESTION! Nanditha N. Malakkla; Chandramohan Meenakshisundaram. Saint Francis Hospital, Evanston, IL. (Tracking ID #2199437)

LEARNING OBJECTIVE #1: To recognize the clinical manifestations of tuberculous effusion and to discuss diagnosis.

CASE: A 61 yo previously healthy Asian male came in with SOB and dry cough since past 2 days. A week prior, he had URI symptoms for which he was prescribed amoxicillin. Chest Xray at that visit revealed right sided pleural effusion and therapeutic thoracentesis was done. He also mentioned 10 pound weight loss in the last 2 weeks and night sweats. He denied hemoptysis, fever, recent travel or sick contacts. He had a 20 pack year history of smoking, but quit 10 years ago. On examination, right supraclavicular lymph node was palpable; lung examination was significant for decreased breath sounds in the right base and dullness to percussion. CT scan of chest showed areas of ground glass opacity in the right lung, right hilar lymph node, pleural-based soft tissue thickening with calcifications on right, and multiloculated moderate to large sized pleural effusion involving the right lung extending to the right lung apex. Repeat thoracentesis was done, which showed highly lymphocytic effusion with elevated ADA suggestive of TB. Quantiferon gold later came back positive. He was started on treatment for tuberculosis.

DISCUSSION: Tuberculosis (TB) is still one of the top three deadly diseases in developing countries with 1.7 million deaths recorded in 2009. Tuberculous pleural effusions occur in up to 30 % of patients with tuberculosis and is the second most common form of extrapulmonary tuberculosis (TB) after lymphatic involvement. Tuberculous pleural effusions can occur with either reactivation disease or primary tuberculosis. Tuberculous pleural effusions are unilateral in majority of cases occurring more frequently on the right side than the left (55 versus 45 %), and are typically small to moderate in size. Patients with tuberculous pleural effusion present with acute febrile illness with nonproductive

cough (94 %) and pleuritic chest pain (78 %), night sweats, chills, weakness, dyspnea, and weight loss. Sputum smear and sputum culture remain the 'gold-standard' techniques for diagnosis of TB. Tuberculosis is the most common cause of pleural effusion in developing countries but it is difficult to diagnose due to its paucibacillary nature: positive cultures are seen in less than 25 % of HIV-negative cases. Diagnostic evaluation of pleural effusion in the setting of suspected tuberculous pleuritis begins with thoracentesis. The pleural fluid is generally exudative with protein concentration >3.0 g/dL and lactate dehydrogenase level commonly exceeding 500 IU/L. Cultures are positive in <30 % of cases. Pleural biopsy is needed when there is moderate to high suspicion for TB and pleural fluid evaluation is not diagnostic. Host immune factors provide greater diagnostic accuracy, including levels of IFN- γ and Adenosine Deaminase (ADA) both of which have >95 % specificity and sensitivity. Treatment includes a four-drug regimen. Therapeutic thoracentesis can be performed in patients with large, symptomatic effusions. With appropriate therapy, most patients defervesce within 2 weeks; in most cases, pleural fluid is resorbed within 6 weeks, but residual pleural thickening can occur.

THE BALLET DANCER'S BACK PAIN Patrick L. Dantzer. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2198795)

LEARNING OBJECTIVE #1: Recognize the differential diagnosis for lower back pain in a young adult

LEARNING OBJECTIVE #2: Recognize and diagnose ankylosing spondylitis

CASE: A 22-year-old previously healthy female ballet dancer presented with chronic lower back pain. The patient developed insidious, progressive lower back and buttock pain beginning one year prior. The pain began on the left side but later alternated from left to right. It was aggravated by movement while dancing and improved, though did not remit, with rest. After initially attributing her symptoms to muscular strains, she was evaluated by an orthopedic specialist and diagnosed with a stress fracture of the sacroiliac (SI) joint based on a bone scan showing increased tracer uptake along the left SI joint. With rest and ibuprofen, the patient's symptoms continued to wax and wane. During an acute flare, she underwent magnetic resonance imaging (MRI) of her spine which revealed bilateral left worse than right sacroiliitis, as well as possible bony erosions, and she was continued on ibuprofen. Her symptoms continued along a relapsing/remitting course until she presented to our office for emergency room follow-up of an acute flare. Physical examination demonstrated reduced lumbar flexion by Schober's test, tenderness to palpation over the bilateral SI joints, and positive Patrick's/FABER test. History, physical, and prior imaging studies raised the concern for spondyloarthritis, specifically ankylosing spondylitis (AS). Laboratory testing revealed erythrocyte sedimentation rate (ESR) 60, C-reactive protein (CRP) 7, and HLA-B27 positivity, all consistent with AS. She was referred to rheumatology where a diagnosis of AS was confirmed. She was started on indomethacin with marked improvement in her symptoms and inflammatory markers, and she was able to resume her dance regimen.

DISCUSSION: AS is the most common variant of spondyloarthritis, a family of chronic inflammatory disorders of the axial skeleton. AS is manifested by pain of the lower back/buttocks secondary to sacroiliitis and progressive stiffness of the spine secondary to fibrous bridging of the spinal joints and discs. Symptoms may be limited to the axial skeleton, as seen in our patient, but the disease may also involve the hips, shoulders, and peripheral joints, in addition to extraarticular manifestations, including uveitis, inflammatory bowel disease, and psoriasis among others. It classically presents in the third decade of life with an estimated 2–3:1 male predominance. AS is a clinical diagnosis made based upon a combination of symptoms and clinical, laboratory, and imaging findings. A patient with chronic back pain (at least 3 months) beginning before age 45 should obtain an anterior-posterior plain radiograph of the pelvis to examine the SI joints. A diagnosis of AS can be made if the imaging meets criteria for sacroiliitis. Pertinent lab findings to support a diagnosis of AS include HLA-B27 positivity and elevated acute phase reactants (CRP/ESR), both of which were seen in our patient. While imaging findings are critical to diagnosing AS, negative plain films do not rule out other forms of spondyloarthritis. In the absence of plain film changes, findings suggestive of spondyloarthritis include inflammatory type back pain (onset before the age of 40 years, insidious onset, improvement with exercise, no improvement with rest, and pain at night), heel pain (enthesitis), dactylitis, uveitis, family history of spondyloarthritis, inflammatory bowel disease, alternating buttock pain, psoriasis, asymmetric arthritis, positive response to NSAIDs, and elevated acute phase reactants. Lower back pain is a frequent chief complaint in a variety of clinical settings, and among these patients it is believed that AS and other forms of axial spondyloarthritis compose roughly 5 %. The differential diagnosis of spondyloarthritis includes acute or chronic mechanical back pain, fibromyalgia, diffuse idiopathic skeletal hyperostosis (DISH), vertebral compression fracture, SI joint infection, osteitis condensans ilii, and erosive osteochondrosis and Schmorl's nodes. Our patient's diagnosis was likely delayed due to several factors including female sex, pain worsening rather than improving with exercise, inconsistent improvement with NSAIDs, and attribution to another plausible cause (musculoskeletal injury).

THE CARDIAC EFFECTS OF HYPOTHYROIDISM Rehaan Shaffie; Lauren Shapiro. Montefiore Medical Center, Bronx, NY. (Tracking ID #2200213)

LEARNING OBJECTIVE #1: Recognize the importance of hypothyroidism as a cause of pericardial effusion.

LEARNING OBJECTIVE #2: Appreciate the physical exam findings of tamponade.

CASE: A 43 year old woman presented to the emergency department with two days of diaphoresis and lightheadedness. She had a past medical history of hypertension, hypothyroidism, and uterine fibroids. On further questioning, she reported fatigue progressing over several months associated with exertional dyspnea, decreased exercise tolerance and bilateral leg swelling. Physical exam showed distended jugular veins, tachycardia, and distant heart sounds. Electrocardiogram showed sinus tachycardia with left ventricular hypertrophy and lateral T wave inversions. Chest x-ray showed an enlarged cardiac silhouette and was otherwise unremarkable. Based on the physical exam and chest x-ray, pulsus paradoxus was measured and exceeded 20 mmHg. Echocardiography was notable for prominent pericardial fluid, right ventricular collapse, respiratory variation across the tricuspid valve, and a plethoric inferior vena cava. Her TSH was 159 microU/mL and free T4 was 0.55 ng/dL. She was treated acutely with emergent pericardiocentesis and drainage of 1450 ml of chylous fluid. She had been non-adherent with her home thyroid supplementation. She was restarted on levothyroxine supplementation with improved symptoms.

DISCUSSION: The differential for pericardial effusion is varied, including pericarditis, inflammatory disorders, hypothyroidism, malignancy, and infection. Hypothyroidism is an uncommon cause of pericardial effusion. Literature review revealed primarily case reports without prevalence data. As illustrated by this patient, even profound hypothyroidism can be clinically subtle, allowing effusion to be met with compensation until the point of near medical emergency. Typical cardiovascular manifestations of hypothyroidism include decreased heart rate and contractility leading to decreased cardiac output, and an increase in peripheral vascular resistance. As in this patient, the development of effusion reverses those changes, and she presented tachycardic with orthostatic hypotension. These findings, in conjunction with gradually progressive fatigue, decreased exercise tolerance, dyspnea, and the physical exam, suggest worsening underlying hypothyroidism. Physical exam findings of effusion include Beck's triad: hypotension, muffled heart sounds and jugular venous distention; as well as pulsus paradoxus. Pulsus paradoxus can be measured by inflating a blood pressure cuff until the Korotkoff sounds are absent, and then gradually deflating until the sounds are heard intermittently during expiration. This first pressure signifies the highest expiratory pressure. The cuff is then deflated until both Korotkoff sounds are heard. A difference between these pressures of above 10 mmHg is abnormal and suggests tamponade. With adequate clinical suspicion, diagnosis can be made by echocardiogram. As in this patient, pericardial effusion due to hypothyroidism is also characterized by fluid that has a high protein and cholesterol content. Emergent treatment is indicated in the presence of cardiac tamponade, and includes either needle decompression or surgical intervention. Typically, hypothyroid pericardial effusion manifests less dramatically, and can instead be managed medically, via titration of exogenous thyroid hormone.

THE CASE OF THE MISSING BAND: A DECEPTIVE CLONE Minghao Liu; Danit Arad. Montefiore Medical Center, Bronx, NY. (Tracking ID #2198487)

LEARNING OBJECTIVE #1: Recognize the limitations of serum protein electrophoresis (SPEP) in detecting multiple myeloma.

LEARNING OBJECTIVE #2: Diagnose light chain myeloma, an uncommon variant of multiple myeloma.

CASE: A 66 year-old man presented with 6 months of migratory body aches, slowed walking and 20-pound weight loss. Exam was benign with no neurological deficits and no focal pain. Labs revealed hemoglobin 10.5 g/dL, creatinine 1.2 mg/dL and normal erythrocyte sedimentation rate, creatine kinase, thyroid stimulating hormone, prostate-specific antigen and liver tests. Serum protein electrophoresis (SPEP) showed hypogammaglobulinemia with no monoclonal protein (M protein). He was admitted 6 weeks later for intractable back pain and found to have creatinine 3.9 mg/dL, random urine protein-to-creatinine ratio 9.4 and calcium 11.9 mg/dL. There was a soft tissue mass in the L2 vertebral body with epidural extension on MRI. Computed tomography scan obtained prior to interventional radiology-guided fine needle aspiration of this mass incidentally revealed multiple lytic lesions in the spine. Free kappa/lambda ratio was 0.05 and immunofixation showed free lambda. Repeat SPEP showed M protein in the beta region, as did urine protein electrophoresis (UPEP). Atypical plasma cells staining positive for lambda had replaced 90 % of the bone marrow on biopsy.

DISCUSSION: Our patient presented with vague but concerning symptoms that raised suspicion for a variety of etiologies. His initial SPEP was deceptive—it lacked the monoclonal protein band classically associated with a clonal plasma cell disorder.

Therefore, efforts focused on characterizing the spinal mass as the key to diagnosis. Imaging obtained to facilitate the biopsy of this mass showed lytic lesions, which combined with his acute renal failure, heavy proteinuria and hypercalcemia increased suspicion for multiple myeloma. Subsequent tests and bone marrow biopsy confirmed the diagnosis of light chain myeloma, a variant of multiple myeloma. Light chain myeloma comprise up to 20% of all forms of multiple myeloma. Multiple myeloma is the malignant expansion of a clone of plasma cells which infiltrates the bone, suppresses the production of normal blood cells and stimulates osteoclastic activity. These plasma cells produce monoclonal protein in the form of immunoglobulin (unless the cells are nonsecretory), which migrates to a certain region of the agarose gel of the serum protein electrophoresis. This band of identical proteins on gel is represented as a peak on densitometer tracing. The peak usually appears in the gamma region because immunoglobulins tend to settle there due to their size and charge. However, in light chain myeloma only a part of the immunoglobulin is produced—the kappa or lambda light chain. The sole expression of light chains (and lack of heavy chains) may manifest as a decrease in the size of the gamma region (i.e. hypogammaglobulinemia, as seen in our patient). In addition, because of rapid excretion of light chains in the urine, serum concentrations of these proteins may be initially too low to register as a spike on SPEP. Renal failure, which is more common in light chain myeloma than in other forms of multiple myeloma, cause serum concentrations of M proteins to rise, in this case to a detectable level on the second SPEP. For these and other reasons, SPEP is 82% sensitive in detecting a monoclonal peak. More sensitive tests are needed to detect light chain myeloma earlier in its course. Serum immunofixation in addition to SPEP increases the sensitivity to 93% in patients with myeloma. Adding a free light chain assay or urine monoclonal protein study (urine protein electrophoresis or urine immunofixation) increases the sensitivity to 97%. When there is high clinical suspicion for multiple myeloma, SPEP must be sent in conjunction with these other more sensitive tests to detect variants such as light chain myeloma. Because renal failure is more common in light chain myeloma, early detection is crucial. Diagnosing light chain myeloma requires looking beyond the SPEP.

THE COMA YOU CAN'T MIX UP Aimee E. Hiltbold²; Ahmed Mohiuddin¹. ¹Tulane University, New Orleans, LA; ²Tulane University Medical Center, New Orleans, LA. (Tracking ID #2199256)

LEARNING OBJECTIVE #1: 1. Recognize the clinical presentation of myxedema coma.

LEARNING OBJECTIVE #2: 2. Appreciate the pathophysiology and treatment of myxedema coma.

CASE: An 85-year-old woman presents with worsening somnolence and altered mental status. Symptoms began 1 week prior with lethargy progressing to unresponsiveness. Her past medical history is significant for DM, HTN, and paroxysmal Afib. Medications include carvedilol, lisinopril, and amiodarone. Initial vital signs are T: 32, HR: 55, RR: 18, SpO₂: 90% on 5 L NC, and BP: 76/53. Her GCS is 7, and she has an edematous face and tongue, bradycardia, crackles at the lung bases, non-pitting edema of the lower extremities, and brisk reflexes with a diminished return. EKG shows sinus bradycardia with low voltage. CXR demonstrates low lung volumes and a pleural effusion in the LLL. ABG is 7.28/24.6/62.4/11.3/saturating 87% on FiO₂ 36%. Laboratory evaluation reveals Na 156, K 2.2, Cl 135, HCO₃ 9, BUN 31, Cr 2.1, gluc 68, and Ca<5.0, WBC 2.9, Hgb 7.6, plts 131. TSH is >100, and FT4 is 0.35. Cortisol is normal. She is immediately intubated and treated for myxedema coma.

DISCUSSION: Prompt recognition of severe hypothyroidism is important for the practicing internist, as mortality approaches 30–40%. Clinical hallmarks include decreased mental status and hypothermia. Hypotension, bradycardia with low voltage, hyponatremia, hypoglycemia, and hypoventilation are often present. Mucin deposits in subcutaneous tissues cause non-pitting edema of the face, tongue, and extremities. Neurologic manifestations include abnormal reflexes, lethargy, and obtundation. Central depression of ventilatory drive occurs, causing hypoventilation with respiratory acidosis. Up to half of patients exhibit hyponatremia, believed secondary to inability to excrete free water. Because free T₄ regulates thermogenesis, inadequate FT₄ causes hypothermia. Hypoglycemia may be caused by hypothyroidism alone or by concurrent adrenal insufficiency. FT₄ regulates sympathomimetic activity of the cardiovascular system; therefore, low FT₄ is associated with bradycardia, decreased myocardial contractility, low cardiac output, and hypotension. Myxedema coma may be immediately precipitated by an acute event, such as myocardial infarction or infection. It may also present after long-standing hypothyroidism. Certain medications may be implicated in development of myxedema coma, especially amiodarone and lithium. Evaluation of severe hypothyroidism should include examination for a thyroidectomy scar, history of I-131 therapy or hypothyroidism, and a thorough medication review. Before therapy with thyroid hormone and glucocorticoids are administered, lab evaluation for TSH, FT₄, and cortisol should be obtained. Due to the high mortality rate, treatment of myxedema coma is an emergency and should not be delayed. Treatment consists of intravenous FT₄, supportive measures, steroid administration,

and management of coexisting conditions. Stress dose steroids are recommended in light of possible adrenal insufficiency. Caution must be exercised in elderly patients, as rapidly increasing thyroid hormone concentrations can precipitate myocardial infarction or arrhythmias. Some experts recommend concomitant use of T₃, as the biologic activity of triiodothyronine (T₃) is greater, and its onset of action is more rapid than T₄. Endocrinology guidance is helpful in establishing an appropriate treatment regimen.

THE COVERT CULPRIT: TOXIC SHOCK SYNDROME UNMASKING A PRE-DISPOSITION TO IMMUNE SYSTEM DYSREGULATION AND IGG4-RELATED DISEASE Meng Chen; Darya Rudym; Robert Mocharla; Joshua Denson. New York University School of Medicine, New York, NY. (Tracking ID #2194024)

LEARNING OBJECTIVE #1: Diagnose IgG4-related disease (IgG4-RD) in a patient with recurring organ dysfunction following toxic shock syndrome (TSS).

LEARNING OBJECTIVE #2: Recognize IgG4-RD as a cause of autoimmune hepatitis (AIH).

CASE: A 76 year-old woman with a history of hypertension and asthma was admitted for fever. Vitals were significant for a temperature of 102.6 °F (39.2 °C), blood pressure of 85/39 mm Hg, heart rate of 113, and oxygen saturation of 92% on nasal cannula. Multiple blood cultures grew methicillin-sensitive staphylococcus aureus (MSSA). C-reactive protein was also elevated to 371 mg/L. Despite aggressive fluid resuscitation and broad spectrum antibiotics, the patient progressed to septic shock, requiring endotracheal intubation, mechanical ventilation, vasopressor support, and hemodialysis. Laboratory studies revealed a peak white blood cell (WBC) count of $32.1 \times 10^3/\mu\text{L}$, creatinine of 7.2 mg/dL, and liver function tests (LFT) significant for aspartate transaminase (AST) 363 U/L, alanine transaminase (ALT) 97 U/L, and alkaline phosphatase (ALP) 245 U/L. Over the next few weeks, the sepsis resolved, with improving fever trend, WBC count, and LFTs. However, ten days after resolution of sepsis, the patient began having subacute desquamation in nearly all skin surfaces sparing mucosal tissues. In the setting of positive blood cultures for MSSA, the patient's disease progression met all of the CDC criteria for staphylococcal toxic shock syndrome (TSS), including fever >38.9 °C, hypotension, multi-organ involvement, and delayed erythroderma and desquamation. As the patient's desquamation slowly improved, LFTs remained at normal values and creatinine steadily recovered to 1.0 mg/dL. However, five weeks after sepsis resolution, the patient had progressive asymptomatic rise of LFTs to peaks of AST 435 U/L, ALT 117 U/L, ALP 417 U/L, GGT 303 IU/L. Multiple abdominal ultrasounds ruled out structural or vascular abnormalities. Extensive work-up was negative for viral hepatitis, alpha-1-antitrypsin deficiency, Wilson's disease, primary biliary cirrhosis, and systemic lupus erythematosus. However, the patient had positive antinuclear antibodies titer of 1:320 and positive anti-smooth muscle antibody titer of 1:40, indicating likely autoimmune hepatitis (AIH). Additionally, immunoglobulin panel revealed a highly elevated IgG level of 3360 mg/dL, with IgA and IgM in normal range. Due to suspected IgG4-related disease (IgG4-RD), IgG4 level was sent and found to be elevated to 271 mg/dL (normal range 2.4–121 mg/dL), signifying IgG4-RD as the likely etiology of patient's AIH.

DISCUSSION: IgG4-RD is a newly recognized immune-mediated disease, first reported in 2003 as a systemic condition causing extra-pancreatic disorders in patients with autoimmune pancreatitis. However, IgG4-RD remains difficult to diagnose due to its recent identification and its variable pattern that can cause multiple characteristic organ pathologies. These include sialadenitis, interstitial pneumonia, pericarditis, pancreatitis, cholangitis, colitis, nephritis, etc. A number of recent studies have described IgG4-RD causing autoimmune hepatitis. One report concluded that AIH may be divided into either IgG4-related AIH or non-IgG4-related AIH, with the former showing a more marked response to steroid therapy. Additionally, studies have described the link between the IgG4 antibody subclass and TSS, as only IgG1 and IgG4 subclass antibodies have specifically been shown to neutralize the TSS toxin-1. We report here a case of IgG4-RD causing AIH following TSS. Our patient had delayed LFT derangements occurring after LFTs had completely recovered from the initial rise secondary to septic shock. Thus, a second process was suspected, and IgG4-RD causing AIH was diagnosed. It is possible that the patient had an underlying IgG4-RD predisposition, and the immunologic response to TSS caused an overdrive of IgG4 antibody production. This then lead to pathologic IgG4-RD manifested as AIH. Due to IgG4-RD's recent discovery and ongoing characterization, its diagnostic criteria have not been firmly established in the literature. Our patient met the criteria promulgated by Okazaki et al., with elevated IgG4 levels >135 mg/dL and characteristic organ involvement. However, she refused histopathologic analysis of liver and skin and was clinically improved by the time IgG4-RD was suspected. She will be followed closely in our outpatient clinic with recommended steroid therapy and biopsy for any further IgG4-RD exacerbations. Current therapies for IgG4-RD include glucocorticoids and rituximab. The disease generally responds well to steroid therapy, especially if initiated early in the course. Thus, as we come to a better understanding and familiarity with this disease, it is important to consider

IgG4-RD as a treatable etiology of autoimmune hepatitis. Additionally, further elucidation of IgG4-RD pathogenesis is needed, including investigation of TSS as a possible risk factor.

THE DANGER OF NON-STEROIDAL SUPPLEMENTATION IN BODY-BUILDERS Karin Chen¹; Geeta Varghese². ¹Mount Sinai Beth Israel, New York, NY; ²Mount Sinai Beth Israel, First Avenue at 16th Street, NY. (Tracking ID #2200005)

LEARNING OBJECTIVE #1: Recognize the dangers of over-the-counter performance enhancing supplements

LEARNING OBJECTIVE #2: Describe importance of inquiring about supplement use

CASE: A 31 year-old healthy male with no significant past medical history presented to clinic requesting testosterone levels after he initiated performance enhancing supplements. In preparation for his first amateur bodybuilding competition, the patient started the supplement "PharmaFreak Test Freak," under the advisement of his bodybuilding coach. He started the supplement 1 month prior to his clinic visit. He was not taking any prescription medication or other over-the-counter supplements. Social history was significant for tobacco use and the absence of alcohol and illicit drug use. He had no complaints at the time of his visit. Review of systems was positive for increased libido, while all other systems were negative. Physical exam was notable for a muscular build and mild gynecomastia. An extensive dialogue was held with the patient regarding over-the-counter supplements, including discussion about the lack of standardized clinical studies, lack of standardization of dosage and manufacturing because this industry is not regulated. Despite this conversation, his increased libido, and physical exam findings, the patient continued the PharmaFreak Test Freak supplement citing competition preparation. Lab work revealed elevated testosterone levels, subdivided into Free (direct) >50 pg/ml (8.7–25.1 pg/ml), and Total, LC/MS 1670.2 ng/ml (348.0–1197 ng/dL), as well as elevated total estrogens 2130 pg/ml (40–115 pg/mL) and low prolactin 0.4 ng/ml (4.0–15.2 ng/ml). After abnormal labwork returned, the patient was agreeable to cessation of supplement use. The patient is to return to clinic in 3–6 months for re-evaluation and repeat blood work.

DISCUSSION: News headlines frequently highlight exogenous steroid use in professional athletes, but it is not uncommon for young amateur athletes seeking to improve performance and physique to use non-steroidal performance enhancing supplements widely available online and in retail stores. These supplements often contain active ingredients with biological effects, as seen in our patient. The supplement industry remains largely unregulated and ingredients remain vague, both in dosage and manufacturing, from lack of standardization. Furthermore, supplements, like PharmaFreak Test Freak, are often developed from a combination of ingredients with little to no information available regarding drug, dietary, or supplement interaction. Ingredients of PharmaFreak Test Freak include: vitamin B6, magnesium, zinc, "proprietary testosterone support complex," composed of *trigonella foenum graecum* and *tribulus terrestris*, "proprietary DHT support complex," made up of saw palmetto and stinging nettle extracts, and "proprietary estrogen support complex," consisting of hesperidin, apigenin, and resveratrol. This supplement is advertised to boost free and total testosterone, as well as strengthen muscles. In light of recent research about the risks of testosterone supplementation including increased cardiovascular risk, it is even more important to recognize the hidden dangers of over-the-counter performance supplementation, especially in these unregulated forms.

THE DIAGNOSIS AND TREATMENT OF TRACHEOBRONCHOMALACIA: A BREATH OF FRESH AIR Angeline J. Sabol; Adam P. Sawatsky. Mayo Clinic, Rochester, MN. (Tracking ID #2195209)

LEARNING OBJECTIVE #1: Recognize tracheobronchomalacia in a patient with COPD.

LEARNING OBJECTIVE #2: Manage tracheobronchomalacia in a patient with COPD.

CASE: A 76 year-old woman with a diagnosis of severe COPD and Giant Cell Arteritis presented to her primary pulmonologist with increasing cough, dyspnea and a new continuous oxygen requirement. Seven months prior to this presentation, she started to have increased shortness of breath and limitations in her physical activity. Over the next several months, she had several hospitalizations for acute COPD exacerbations with associated dyspnea, wheezing, and chest tightness. Each hospitalization resulted in improved wheezing and chest tightness but continued shortness of breath. Her pulmonary function test 3 months prior to presentation revealed an FEV1/FVC ratio of 40.9 % and an FEV1 of 33 %. She was followed closely by her primary care doctor who continued her on a regimen of salmeterol/fluticasone, albuterol HFA, tiotropium, prednisone 10 mg daily (for Giant Cell Arteritis), and albuterol nebulized solution as needed. Two months prior to presentation she was started on daily azithromycin for its anti-inflammatory properties and her salmeterol/fluticasone was switched to salmeterol alone because of her previous history of pneumonia and the concern for an association between inhaled steroids and

pneumonia. She was hospitalized 1 month prior to presentation for a COPD exacerbation and treated with prednisone taper. She was then seen by her pulmonologist a week prior to presentation and was started on Augmentin and prednisone 40 mg daily for 5 days due to her continued dyspnea and wheezing. Upon presentation, she had resumed her home dose of 10 mg daily. The patient was admitted directly from the pulmonologist office for work-up of her persistent symptoms. CT angiography of the chest was performed which ruled out pulmonary embolism. It demonstrated bilateral bronchial thickening and mild ground glass opacities in the apices, less extensive than predicted by her severe symptomatology. Bronchoscopy with bronchoalveolar lavage was performed on day 3 due to the concern for infection given the CT scan findings. It demonstrated tracheobronchomalacia with approximately 75 % collapse of the posterior membrane in the trachea with expiration, and almost complete collapse in the right and left mainstem bronchi. She was not a candidate for an airway stent as she had closure of the small airways distal to the two main bronchi, limiting its utility. We started her on CPAP therapy in conjunction with her home medications. She did not feel significant relief with the CPAP and it was discontinued. She was discharged without resolution of symptoms, and was recommended physical therapy as an outpatient to maximize her exercise tolerance.

DISCUSSION: COPD is an extremely common disease and is increasing in prevalence in most of the world. Chronic lower respiratory disease is the third most leading cause of death in the United States. This case demonstrates an example of an initial misdiagnosis as a COPD exacerbation and illustrates the importance of thinking of tracheobronchomalacia (TBM) when a COPD exacerbation is not resolving with traditional therapies. The prevalence is unknown, however in a study looking at the relationship between COPD and TBM, 40 % of patients with TBM had COPD. Symptoms described are similar to COPD and include dyspnea, cough, sputum production, and hemoptysis. When there is little symptom improvement with maximal therapy, TBM should be considered. Bronchoscopy is considered the gold standard for the diagnosis, but end-inspiratory and end-expiratory CT scanning and multidetector CT scanning can also be used (1). Management of TBM includes optimization of treatment for the underlying disease and symptom control, including smoking cessation and relaxation techniques (1). NSAIDs, corticosteroids or other immunosuppressants can be tried before procedural-based therapies are initiated. CPAP reduces resistance and improves expiratory flow, however there are no studies demonstrating its long-term efficacy (2). It also can be potentially dangerous in a patient with COPD as it can worsen air-trapping. Stent placement and tracheoplasty are other options, however these are much more invasive. Due to complications of persistent cough, infections, and stent migration, stents are not recommended until other conservative options fail; a temporary stent can be placed and demonstrates symptom improvement (3). 1. Kandaswamy, Chitra; Balasubramanian, Vijay. Review of Adult Tracheomalacia and its Relationship with Chronic Obstructive Pulmonary Disease. *Current Opinion in Pulmonary Medicine*; 2009; 15:113–119. 2. Murgu, Septimiu D. Pneumatic Stenting for Tracheobronchomalacia. *Journal of Bronchology and Interventional Pulmonology*; 2014; 21:109–112. 3. Sagar, Damle S.; Mitchell, John D. Surgery for Tracheobronchomalacia. *Seminars in Cardiothoracic and Vascular Anesthesia*; 2012; 16:203–208.

THE DISAPPEARING LACTATE: ETHYLENE GLYCOL AND LACTIC ACIDOSIS Molly A. Fisher; Andrea Carter. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2195662)

LEARNING OBJECTIVE #1: To diagnose ethylene glycol toxicity.

LEARNING OBJECTIVE #2: To recognize the difference in lactate run from an arterial blood gas analyzer versus a serum analyzer in a patient with ethylene glycol toxicity.

CASE: MJS is a 76 year old female with no significant past medical history who presented after her family found her unresponsive at home. She was last seen by her family in her usual state of health 6 h prior to arrival and at that time had only been complaining of mild abdominal pain. On arrival to the hospital, she was unresponsive and immediately intubated. Her arterial blood gas (ABG) on arrival showed pH 6.94, PaCO2 20, PaO2 105, and HCO3 4 which indicated a severe metabolic acidosis without appropriate respiratory compensation; lactate run on the blood gas analyzer was 11. Her serum electrolytes on arrival included sodium 142, chloride 111, blood urea nitrogen 19, glucose 203, and measured serum osmolality of 302 which leaves an anion gap of 27 and an osmole gap of 61. Her initial labs also included a white blood cell count 11.4, acetaminophen level 204, and urine toxicology screen positive for opioids and propoxyphene. Electrocardiogram showed sinus bradycardia with a prolonged corrected QT interval (523 ms). CT chest was unremarkable, CT abdomen/pelvis with contrast showed colonic wall thickening and mild stranding indicative of colitis, and CT head was negative for evidence of bleed or large stroke. Ethylene glycol toxicity was suspected, so serum ethylene glycol level was sent and came back elevated at 184. While placing a dialysis catheter and awaiting initiation of dialysis, her lactate run on an ABG analyzer continued to rise and peaked at 22. However, a serum lactate that was drawn at the same time came back at 2.9. She was dialyzed, regained consciousness and full neurologic function, was extubated, and admitted to a suicide attempt by ingestion of ethylene glycol. Her acidemia

resolved with dialysis, she regained kidney function, and she was admitted to a psychiatric hospital for care of her depression.

DISCUSSION: Ethylene glycol toxicity can be difficult to diagnose and if missed on an initial assessment, can be fatal. It is possible to test for ethylene glycol in the serum but it can take several hours to get a result and many hospitals do not have this capability. There are other lab abnormalities that can come back immediately which would indicate that the patient may have ingested ethylene glycol. These include an elevated osmole gap, a lactate that is elevated on the ABG analyzer but not when run from the serum, and crystals in the urine. The osmole gap (OG) is the difference between the measured serum osmolality and the calculated serum molarity. This value will be elevated in any alcohol toxicity. The second indication is a discrepancy in the serum lactate and the lactate run on the blood gas analyzer. Ethylene glycol is metabolized into glycolate, which is chemically similar to lactate. On many blood gas analyzers, the analytical reagent L-lactate oxidase cross-reacts with glycolic acid and glyoxylic acid, and can give a falsely elevated lactate. The last lab abnormality seen is crystals in the urine which come from oxalic acid, another byproduct of the breakdown of ethylene glycol. The crystals can be seen on light microscopy and are usually needle or envelope shaped. Additionally, urine can be examined with a Wood's lamp and if fluorescence is observed, this can indicate the presence of fluorescein which is often added to commercial antifreeze products to help detect radiator leaks. These various ways of detecting ethylene glycol can allow a more prompt diagnosis of ethylene glycol toxicity and should be considered in any patient in which toxic alcohol ingestion is on the differential.

THE ELUSIVE PALINDROMIC RHEUMATISM Julia Manasson; Philip Chuang; Vanessa Charubhum; Angela Hou; Ann Garment. New York University School of Medicine, New York, NY. (Tracking ID #2174493)

LEARNING OBJECTIVE #1: To recognize the pertinent features of palindromic rheumatism, a rare rheumatologic condition.

LEARNING OBJECTIVE #2: To discuss the broad differential of monoarthritis.

CASE: A 59 year-old woman with a history of diabetes presented with 1 day of right shoulder pain. The pain was sudden, severe, and woke her in the night. She denied recent joint trauma. Several hours later she noted swelling around the shoulder and pain radiating to her right elbow and wrist. Ice and naproxen did not offer relief so she came to the hospital. On further history, the patient recalled three additional isolated episodes of monoarticular pain and swelling in her knee, arm, and ankle over the last four years. Each time the pain resolved spontaneously. Family history was remarkable for possible rheumatoid arthritis (RA) in her mother and brother. Review of systems was negative for fevers, weight loss, photosensitivity, rash, dry eyes and mouth, mucosal ulcers, back and neck pain, joint stiffness, and recent gastrointestinal and genitourinary infections. The right shoulder, elbow, and wrist were warm, tender, mildly swollen, and non-erythematous. Range of motion was limited by pain. All other joints were unremarkable. No rashes or tophi were noted. Multiple attempts at arthrocentesis were unsuccessful so fluid could not be aspirated for analysis. Initial labs were significant for a leukocytosis of $18.8 \times 10^9/L$ (87.2 % neutrophils), erythrocyte sedimentation rate (ESR) of 30 mm/h, c-reactive protein (CRP) of 103 mg/L, and a normal uric acid. The diagnoses of trauma, septic arthritis, and crystal arthropathy were initially entertained. However, several days later additional labs resulted in an anti-nuclear antibody (ANA) of 1:80 in a homogenous pattern, rheumatoid factor (RF) of 184 IU/mL, and anticyclic citrullinated peptide antibody (ACPA) greater than 250 units. Hand and foot X-rays showed osteoarthritic changes but no erosive joint damage. Shoulder MRI revealed a 50 % partial thickness supraspinatus tear, thought to be secondary to chronic stress on the joint. Given the patient's multiple presentations of asymmetric acute monoarthritis that resolved with minimal intervention, as well as very elevated RF and ACPA antibodies, she was diagnosed with palindromic rheumatism (PR) and started on low-dose prednisone and ibuprofen with significant improvement in symptoms. She continues to follow with rheumatology.

DISCUSSION: Monoarticular arthritis has a broad differential. Common etiologies include trauma, osteoarthritis, septic arthritis, reactive arthritis, crystal disease, enteropathic arthritis, and hemarthrosis. PR is a rare condition that is often overlooked. It is an idiopathic syndrome that typically presents as recurrent monoarticular or oligoarticular joint inflammation without precipitating factors or systemic symptoms. Inflammation spontaneously resolves, and there is no residual joint damage. Studies show that a significant proportion of patients with PR, especially those with positive RF and/or ACPA antibodies, eventually develop RA or another connective tissue disease. It remains unclear whether PR is a harbinger or simply within the spectrum of RA.

THE HOOK EFFECT: DON'T TAKE THE BAIT! Akshata Moghe; Hoda Kaldas. University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #219953)

LEARNING OBJECTIVE #1: Assess the possibility of 'hook effect' in case of discrepancies in the clinical picture and laboratory results

LEARNING OBJECTIVE #2: Recognize the clinical and laboratory signs of nephrotic syndrome

CASE: A 76 year old woman with hypertension and Crohn's disease presented with a 1 month history of a 15 lb weight gain, progressive edema, fatigue, decreased exercise tolerance and dyspnea on exertion. Review of systems was significant for dark-colored urine with a musty odor. She denied any fevers, chills, cough, chest pain, palpitations, or orthopnea. Medications included Losartan and Adalimumab; both of which were started 6 months prior to presentation. On physical examination, she was afebrile with a blood pressure of 176/86 mm Hg, heart rate of 75 beats per minute and a respiratory rate of 16 per minute. Her JVP was 7 cm above sternal angle, and she had a loud S2 with gallop on cardiac exam. Lungs were clear to auscultation. She had 3+ pitting edema of her arms and legs, with trace periorbital edema. EKG showed left ventricular hypertrophy and chest x-ray showed clear lungs with mild cardiac enlargement. Initial labs were notable for: BNP 206 pg/ml, albumin 2.7 mg/dl and creatinine 1.4 mg/dl with a baseline of 0.8 mg/dl 9 months prior. Serum cholesterol was 307 mg/dl and LDL was 191 mg/dl. Urine examination revealed protein >1000 mg/dl, albumin 17.6 mg/dl, trace blood, many WBCs and granular casts but no bacteria or eosinophils. Albumin to creatinine ratio was calculated to 81.6. A renal ultrasound was normal.

DISCUSSION: This patient's edema, hypoalbuminemia, proteinuria, hyperlipidemia and fatigue were pathognomonic of nephrotic syndrome. Spot and 24-hour urine collections showed massive proteinuria but, surprisingly, minimal albuminuria. This was in conflict with the diagnosis of nephrotic syndrome and raised the suspicion for a paraproteinemia. However, serum and urine protein electrophoresis did not show monoclonal immunoglobulins; instead there was a large albumin spike on the urine electrophoresis, quite in contrast to the minimal albuminuria. This is suggestive of the 'hook effect,' and a return to the original diagnosis of nephrotic syndrome. The hook effect, also called the prozone effect, is a phenomenon which sometimes occurs in immunoassays wherein a false negative or erroneously low test result is obtained due to extremely high analyte levels. In these assays, an accurate positive result is obtained when antibodies from the patient's serum bind and bridge antigens in the assay leading to immune complex formation and agglutination. However, if antibodies occur in excess, they flood the antigen pool, saturate all binding sites and prevent effective cross-bridging and agglutination. Serial dilutions of the patient's serum often reveal the true results by optimizing the antigen to antibody ratio in the assay. In our patient, the true urine albumin level was calculated to be 1526 mg/dL with a urine protein of 2200 mg/dL. Her 24 h-urine sample actually contained 6 gm albumin and 8.5 gm total protein. Further investigations with a renal biopsy showed minimal change disease. The newly started Adalimumab was thought to be the culprit and was discontinued. There are rare accounts of Adalimumab-induced glomerular disease in the literature. She was started on steroid therapy and is being actively followed on an outpatient basis.

THE IMPORTANCE OF PATIENT EDUCATION AND COMMUNICATION AT HOSPITAL DISCHARGE: A CASE OF RAPID RECOGNITION AND READMISSION FOR GUILLAIN-BARRE SYNDROME AS A RESULT OF THE TEACH-BACK METHOD Ramy Sedhom; Ranita Sharma. Rutgers- Robert Wood Johnson, Staten Island, NY. (Tracking ID #2193631)

LEARNING OBJECTIVE #1: Recognize the transition from hospital to home as a vulnerable period for adverse events.

LEARNING OBJECTIVE #2: Implement the teach-back method at discharge to effectively communicate disease management.

CASE: Physician-patient communication is fundamental to the practice of medicine and is especially important at discharge. However, several studies have demonstrated a disconnect between physician information giving and patient understanding. Despite the recognized importance of a comprehensive discharge summary, it often is not given to patients in a timely manner nor communicated at their literacy level. Thus, absent is critical information about diagnosis, complications, medications, test results and follow-up. We report a case of Guillain-Barre Syndrome (GBS) where effective communication and education at discharge provided for early recognition and timely intervention for this well established sequela of Campylobacteriosis. A 65-year old female with no past medical history was admitted with 4 days of cramping abdominal pain, non-bloody diarrhea (10 episodes/day) and fevers to 101.5. She denied antibiotic use, sick contacts, travel, nausea, vomiting, hemochezia, or melena. She lived alone, and denied smoking, alcohol, or illicit drug use. She presented with a temperature of 99.7 and was not hypotensive or orthostatic. Physical exam revealed dry mucus membranes, hyperactive bowel sounds, and marked tenderness to palpation in the RUQ. Murphy's sign was negative. There was no hepatosplenomegaly. No evidence of ascites or manifestations of chronic liver disease was noted. Stool occult blood testing was negative. Prerenal AKI was suspected with a creatinine 1.3. CBC and hepatic function panel were normal. CT abdomen revealed mesenteric adenitis and right-sided colitis. C. difficile toxin was negative. A diagnosis of Campylobacter infection was made from stool culture. The patient recovered rapidly

with a 5-day course of azithromycin. She left with discharge paperwork and was educated about manifestations of a rare, yet well documented association of a neurologic illness characterized by ascending weakness in her lower extremities and was advised to return if such symptoms were noted. A week later, she developed progressive weakness in her distal lower extremities with difficulty ambulating and fine motor weakness in her hands. She promptly returned to the hospital and requested to be seen by her prior doctors. Preceding campylobacter infection, new ascending paralysis, symmetric areflexia in the lower extremities and CSF albuminocytologic dissociation confirmed the diagnosis of GBS. Sensory symptoms, cranial nerve involvement, respiratory failure or bladder/bowel dysfunction were notably absent. She completed a 1-week course of IVIG with motor function improvement from 2/5 to 4/5 strength in lower extremities at discharge. She regained full function with rehabilitation.

DISCUSSION: In the era of progressively shorter hospital length of stay, the transition from hospital to home is a vulnerable recovery period that frequently requires astute self-monitoring, attention to modified medication regimens, ability to gauge recovery and recognize delayed complications. The absence of reliable social/family support complicates the scenario. Appropriate patient education pre-discharge is the best tool available to minimize the challenges described above. This case illustrates the importance of health care provider driven education. Using the teach-back method, discharge instructions were effectively communicated. The patient articulated an appropriate understanding of the complications of her diarrheal illness, including GBS.

THE IMPORTANCE OF TIMELY REASSESSMENT TO AVOID PREMATURE CLOSURE IN A CASE OF COEXISTENT DISSEMINATED NOCARDIOSIS AND METASTATIC LUNG ADENOCARCINOMA Kristin D'Silva²; Anil N. Makam¹. ¹UT Southwestern, Dallas, TX; ²University of Texas Southwestern, Dallas, TX. (Tracking ID #2194970)

LEARNING OBJECTIVE #1: Recognize that patients with nocardiosis may have concomitant lung cancer, necessitating timely reassessment in patients with a high pretest probability for lung cancer to avoid premature closure.

LEARNING OBJECTIVE #2: Recognize the limitations of lung biopsy in the diagnosis of infection and malignancy.

CASE: A 71-year-old male with past medical history of chronic obstructive pulmonary disease (COPD) and former heavy smoker presented with increased shortness of breath, cough, sputum production, and weight loss of 20 lb over 3 months. The patient appeared ill, with pursed lip breathing, diffuse rhonchi, and end-expiratory wheezing but no accessory muscle usage. He was initially treated for a COPD exacerbation with prednisone and azithromycin, but his symptoms did not improve. Chest CT revealed 2 spiculated pulmonary nodules in each lung, unseen on prior imaging studies. Brain MRI showed a nonspecific enhancing solitary lesion in the left frontal lobe with associated vasogenic edema. Biopsy of one of the lung nodules was negative for malignancy but culture grew *Nocardia nova*. He was started on intravenous imipenem-cilastatin and trimethoprim-sulfamethoxazole. After 6 weeks, chest CT showed improvement of some pulmonary nodules and worsening of others, and brain MRI showed no improvement in the solitary lesion. Biopsy of the brain lesion revealed metastatic poorly differentiated adenocarcinoma, consistent with a primary lung source.

DISCUSSION: *Nocardia* are branched aerobic weakly acid-fast Gram-positive bacilli that live in the soil and can cause local or disseminated infections in immunocompromised patients from inhalation or minor cutaneous trauma. The most common presentation of disseminated disease is pulmonary nodules with hematogenous spread to the central nervous system. *Nocardia* are rarely found as a contaminant in culture and thus should not be ignored. *Nocardia nova* is a rare species but causes an aggressive pattern of dissemination with mortality risk greater than 85 % if untreated. *Nocardia nova* is usually susceptible to amoxicillin, erythromycin, or trimethoprim-sulfamethoxazole, with treatment duration of at least 6 months for pulmonary lesions and 12 months for CNS lesions. In this case, the patient had not only pulmonary nocardiosis but also metastatic lung adenocarcinoma that was discovered on repeat imaging. Given his high pretest probability for lung cancer (smoking history, weight loss, and spiculated nodules), timely reassessment is important to prevent premature closure that can lead to diagnostic delays, even in a setting where the initial results indicate a potentially unifying diagnosis. Additionally, lung biopsy is an imperfect test for detecting cancer and infection, as demonstrated in this case.

THE KEYS TO UNLOCKING THE CASE OF AN ENTRAPPED HEART David M. Pinn¹; Jaime Deseda¹; Jose A. Cortes². ¹Mount Sinai Beth Israel, New York City, NY; ²Beth Israel Medical Center, New York, NY. (Tracking ID #2192176)

LEARNING OBJECTIVE #1: Recognize the challenges of diagnosing and treating TB pericarditis in AIDS patients.

CASE: Forty-two year old Filipino male with AIDS not on HAART (CD4 count 108) presented with shortness of breath, night sweats, weight loss, fevers, and chills. Of note,

negative PPD 1 year prior. Patient fulfilled SIRS criteria and TTE diagnosed a pericardial effusion without tamponade. He was admitted to the CCU and pericardiocentesis significant for no malignancy, elevated LDH, elevated adenosine deaminase (ADA), and negative AFB; culture initially pending. Quantiferon gold test was positive, however, serial sputum and blood AFB were negative. Pan-CT scan showed diffuse lymphadenopathy. Despite broad spectrum antibiotics, breakthrough fevers persisted. Bone biopsy and axillary FNA were negative for malignancy or infection. Patient was discharged once afebrile but readmitted 2 weeks later when the pericardial fluid culture returned positive for pan-sensitive *Mycobacterium tuberculosis* (TB). Axillary and cervical lymph node biopsies also revealed a positive AFB and necrotizing granuloma. Treatment initiated with rifampin, isoniazid, pyrazinamide and ethambutol (RIPE) as well as Stribild. Two days later, acute renal failure and hepatotoxicity developed, new onset atrial fibrillation noted and high clinical suspicion for Addisonian crisis. Intubation was required and TB and HIV treatments were held. Thoracentesis was negative for AFB or malignant cells. Second line TB regimen of Rifampin, Ethambutol and Moxifloxacin was started, as well as intravenous corticosteroids. Renal and hepatic functions normalized, patient extubated and RIPE regimen restarted with Dolutegravir and Epzicom. Follow up care via the New York City Department of Health.

DISCUSSION: Tuberculosis is the leading cause of HIV-related morbidity and mortality in underdeveloped countries, with an estimated 11 million people co-infected and an incidence of 500,000 cases per year. In patients with AIDS, typical TB symptoms may be absent and sputum and blood AFB are often negative. Therefore, atypical presentations such as pericarditis and pericardial effusions in AIDS patients should raise concern for disseminated TB. Chest x-ray and EKG are frequently non-diagnostic; echocardiogram and pericardiocentesis are recommended for diagnosis. However, in the setting of AIDS, diagnostic modalities such as effusion analysis, AFB stains and cultures may still be negative. Elevated pericardial ADA may suggest TB pericarditis. Aside from diagnosis difficulties, TB pericarditis in AIDS patients present treatment challenges such as drug interactions and toxicities, risk of immune reconstitution inflammatory syndrome (IRIS) and controversy involving corticosteroid use. Our case highlights many of the factors that make diagnosing and treating TB pericarditis in AIDS patients so challenging and serves as a lesson for physicians confronting similar scenarios.

THE LOW OF GETTING HIGH—AN UNUSUAL CAUSE OF RENAL CALCULI Sunina Nathoo; Amir Kazory; Maryam Sattari. University of Florida, Gainesville, FL. (Tracking ID #2196789)

LEARNING OBJECTIVE #1: Recognize guaifenesin as a potential cause of renal calculi in patients with drug abuse

LEARNING OBJECTIVE #2: Identify substance abuse as a non-conventional risk factor for stone formation

CASE: A 27 year old man with history of polysubstance abuse and depression presented with nausea, vomiting, and left flank pain. Physical exam revealed normal vital signs, left-sided abdominal pain without rebound or guarding, and left costovertebral angle tenderness. Urinalysis showed pH of 6.0, 66 red blood cells, and moderate hemoglobin. Serum creatinine was 1.26 mg/dL (normal 0.80–1.20 mg/dL). Abdominal/pelvic CT showed 2 renal calculi in the left kidney and distal ureter measuring 4 and 6 mm, left hydronephrosis, and perinephric stranding. Urine uric acid was 880 mg/24 h (normal 250–750 mg/24 h) and urine citric acid was 81 mg/24 h (normal 320–1240 mg/24 h). The patient denied personal or family history of renal calculi, but endorsed taking 8–10 pills of Mucinex DM every 8 h for 6 days prior to admission to “get high.” Mucinex DM is composed of dextromethorphan and guaifenesin, so the patient had been ingesting approximately 1.4 g of dextromethorphan and 29 g of guaifenesin daily. Treatment with intravenous fluids, analgesics, and tamsulosin was initiated. His creatinine normalized after intravenous fluid administration and symptoms resolved completely after 3 days of conservative therapy.

DISCUSSION: The renal calculi in our patient were thought to be due to drug abuse, given the reported amount of ingested medication and temporal association. While dextromethorphan has been associated with high levels of abuse due to its dissociative hallucinogenic effects, the guaifenesin component is actually thought to be responsible for stone formation. In fact, guaifenesin has been reported to account for 35 % of drug-induced stones. The stones are thought to be composed of guaifenesin and its metabolites, which have very high urinary excretion and very low solubility resulting in crystallization. Patients can present with pain, nausea, vomiting, dysuria, hematuria, acute renal failure, and bilateral renal calculi. Interestingly, guaifenesin stones are radiolucent on plain radiographs, but appear similar to uric acid stones on CT imaging and with polarized light microscopy. Stone analysis using infrared spectroscopy may identify beta-2-methoxy-phenoxylactic acid, a guaifenesin metabolite. Moreover, urine uric acid level is usually elevated due to guaifenesin's uricosuric effect and hypocalcemia has also been reported, although its cause is unknown. Treatment options include hydration, urine alkalization, ureteroscopy, and lithotripsy. Similar to our case, rehydration alone has been reported to be effective for stone dissolution without the use of alkalization or other

methods of stone retrieval. Based on this case and previous reports, we suggest that clinicians be aware of the abuse potential of dextromethorphan-containing medications as well as their possible complications and maintain a high level of suspicion in patients presenting with nephrolithiasis as well as history of previous substance abuse or recent drug ingestion. Counseling and treatment for drug abuse will be important to prevent recurrence of calculi.

THE LOW SALT DIE-T Jianhua A. Tau; Jeffrey T. Bates; Andrew Caruso. Baylor College of Medicine, Houston, TX. (Tracking ID #2200264)

LEARNING OBJECTIVE #1: Recognize that salt substitute is almost entirely composed of potassium salt and clinically significant hyperkalemia can develop in CKD patients with sufficient ingestion.

LEARNING OBJECTIVE #2: Recognize that the population which potassium salt substitutes benefit (hypertensive patients) overlaps significantly with the population whom they are most dangerous (CKD patients).

CASE: A 65-year-old man with hypertension, stage 4 chronic kidney disease (CKD), and ischemic cardiomyopathy presents with weakness, bradycardia and sinus arrest. Six months prior to admission, the patient was instructed to adhere to a low salt diet after an admission for heart failure exacerbation. A lover of savory foods, he stopped taking table salt (sodium chloride) and instead switched to Morton's Salt Substitute, using three tablespoons a day with his food. He was taking a stable doses of lisinopril, spironolactone, furosemide, metoprolol, aspirin, high-intensity statin and clopidogrel. One week prior to admission, he developed ascending motor weakness that began in his legs and progressed to his trunk and arms. On the day of admission, he felt lethargic and too weak to get out of bed; he was dizzy upon standing. He had no recent viral syndrome, diarrhea, dyspnea, orthopnea, paroxysmal nocturnal dyspnea, cough, chest pain, or overt bleeding. En route to the emergency room, he developed bradycardia and then cardiac arrest. Cardiopulmonary resuscitation was initiated and he had return of spontaneous circulation within five minutes. A post-resuscitation electrocardiogram showed sinus rhythm with widened QRS complexes. Laboratory data revealed hyperkalemia (8.7 meq/L) and a creatinine of 3.5 mg/dl, which was unchanged from baseline. His cardiac enzymes were normal. He was given IV calcium gluconate and underwent emergent hemodialysis. His neurological symptoms resolved completely with correction of the hyperkalemia. He made a full recovery.

DISCUSSION: Dietary sodium reduction reduces blood pressure. A decrease in sodium intake of approximately 75 meq/day for 4 weeks results in a fall in BP of 5/3 mmHg among. (1) Potassium chloride (KCl) is the salt substitute sold in all major grocers in the USA. One table spoon of Morton's Salt Substitute contains approximately 100 meq of KCl. While severe hyperkalemia from oral potassium is extremely rare if kidney function is normal, oral potassium doses can be large enough to overcome renal excretion in either patients with CKD or those who take potassium-sparing diuretics, angiotensin receptor blockers, or angiotensin-converting enzyme inhibitors. The cohort of patients with renal impairment overlaps significantly with the hypertensive cohort who may perceive salt-substitutes to be a healthy alternative to sodium. In fact, the prevalence of CKD in persons with hypertension is 30–35 %. (2) Meanwhile, the prevalence of hypertension is practically universal in patients with CKD (3). This remarkable case of cardiopulmonary arrest from routine use of potassium-containing salt substitutes emphasizes the need for monitoring nutritional supplement intake in all patient populations. We believe that patients are unaware of these potentially serious adverse effects of potassium in renal disease, and there are inadequate consumer warnings. In summary, clinicians should be vigilant in monitoring potassium intake from salt-substitutes because the population for whom they target (hypertensive patients) overlaps significantly with the CKD population for whom it may be most deadly.

THE MAN WHO CRIED RATTLESNAKE: A CASE ABOUT CROTALINAE ENVENOMATION Chinelo Udemgba; Joseph Camarato; Courtney Shappley; Terry J. Hundley. University of South Alabama, Mobile, AL. (Tracking ID #2199008)

LEARNING OBJECTIVE #1: Recognize the systemic manifestations of snake envenomation.

LEARNING OBJECTIVE #2: Consider further antivenom therapy for complications related to coagulation in moderate to severe envenomation after initial stabilization.

CASE: A 57-year-old man with history of hypertension and dyslipidemia presented to the emergency department with total body stiffness, diaphoresis, fasciculation, paresthesia, and excruciating pain after a rattlesnake pierced his shoe-covered right foot. On arrival, the patient was hemodynamically stable but was profusely bleeding around his intravenous sites and described experiencing episodes of explosive diarrhea, nausea, and vomiting. He had a single puncture wound on the dorsum of his right foot and considerable pitting edema, erythema, and ecchymoses extending up to his mid tibial region. X-ray confirmed

no foreign body within the effected foot. Initial laboratory data included: platelet count of 35,000/mm³, prothrombin time >300 s, activated partial thromboplastin time >300 s, fibrinogen <60 mg/dL, and an incalculable INR. He received 4 vials of crotalidae polyvalent immune fab ovine but showed minimal improvement in subsequent laboratory values and continued symptomatology. He then received intermittent dosing of antivenom for a total of 12 vials overnight and showed significant improvement and subsequently received a standard maintenance therapy dose of 2 vials of antivenom every six hours for 3 doses the following morning. Starting on day 3, the platelet count, PT, PTT, and INR fluctuated widely with the symptom of lethargy. An initial attempt to correct values with fresh frozen plasma proved unsuccessful. His condition eventually stabilized after three separate administrations of maintenance therapy. Before the final third dose, laboratory values improved then plateaued for approximately 24–48 h before declining. The patient was discharged on hospital day 8 with normalized lab values and in stable condition, which remained consistent during a follow-up visit two days post-discharge.

DISCUSSION: The management of snakebites is a relatively common clinical situation encountered by general internists. The family Viperidae, subfamily Crotalinae, includes rattlesnakes, water moccasins, and copperheads and is native throughout the United States, except Alaska, Hawaii, and Maine. Viperidae, also called pit vipers, are responsible for 98 % of the nearly 5000 annual venomous snakebites that occur mostly in summer months when snakes are most active. Approximately 20 % of cases are non-venomous, while 25 % cause mild envenomation. Envenomations by Viperidae are characteristically vasculotoxic and hemotoxic due to proteins and peptides within the venom causing vessel wall damage, impaired platelet aggregation, thrombocytopenia, consumption coagulopathy, and anticoagulation. Other common features of envenomation include neurotoxicity, rhabdomyolysis, and non-specific symptoms such as nausea, vomiting and diarrhea. Antivenom is the standard treatment for moderate to severe snake envenomation. Recognition of the severity of envenomation is key to treatment. The patient experienced severe symptoms, characterized by significant coagulopathy, on admission from apparent poisoning by an Eastern diamondback rattlesnake (*Crotaleus adamanteus*) and was immediately treated with antivenom after the poison control center was contacted, as recommended by an evidence-based unified treatment algorithm. He then required maintenance dosing with antivenom along with supportive care, radiological studies for a possible embedded fang, tetanus prophylaxis, and monitoring for hypersensitivity reactions. As general internists, it is important to be able to recognize and treat recurring coagulopathy associated with snake envenomation. The patient experienced defibrinating syndrome on arrival, which responded well to treatment with antivenom. However, because of an assumed large amount of envenomation in combination with the short half-life of the antivenom, several maintenance doses of antivenom, not fresh frozen plasma, were necessary to control his coagulopathy. By closely monitoring platelet and coagulation values, late-onset envenomation-associated hemorrhaging in this patient was prevented.

THE MAN WHO SWALLOWED A WHISTLE: LOCALIZING AIRWAY OBSTRUCTION IN ANAPHYLAXIS Amy S. Tang. NYU School of Medicine, New York, NY. (Tracking ID #2199274)

LEARNING OBJECTIVE #1: Recognize an atypical presentation of anaphylaxis

LEARNING OBJECTIVE #2: Localize airway obstruction based on characteristics of breath sounds

CASE: A 69-year old man with coronary artery disease and hypertension presented with subacute chest pain, dyspnea, and weight loss. Laboratory studies revealed negative troponins, acute on chronic anemia, elevated creatinine, hypercalcemia, and elevated total protein. Skeletal survey showed innumerable osseous lytic lesions involving the ribs, skull, spine, pelvis, and long bones. Bone marrow biopsy confirmed multiple myeloma and the patient received bortezomib, cyclophosphamide, and dexamethasone as induction chemotherapy with acyclovir and allopurinol for prophylaxis. The patient's dyspnea improved with blood transfusion however his chest pain persisted, exacerbated by sudden movements and deep palpation. He received pamidronate, tylenol, and oxycodone for presumed bony pain. An exercise radionuclide myocardial perfusion study showed ST depressions without coronary perfusion or focal wall motion abnormalities limited by dyspnea. Transthoracic echocardiogram was unremarkable with normal ejection fraction. Cardiology consult recommended ranolazine for possible angina. Six hours after taking ranolazine, he developed a loud high-pitched polyphonic expiratory wheeze localizing to his neck and not improved with nebulized albuterol. He maintained normal oxygen saturations on room air but reported mild respiratory distress. His expiratory wheeze worsened overnight with new tongue swelling and facial edema. Laryngoscopy showed no oropharyngeal, laryngeal, or tracheal edema. Chest imaging showed no evidence of pulmonary congestion or obstructing mass such as plasmacytoma. He received intravenous benadryl and solumedrol with marked improvement in his angioedema and bronchial wheeze. Ranolazine and allopurinol were identified as possible causal agents and added to his allergy list. He was discharged on a five day course of oral prednisone with follow-up in hematology for chemotherapy.

DISCUSSION: Anaphylaxis is frequently underdiagnosed due to failure to recognize presentations without obvious rash or shock. This patient fulfilled diagnostic criteria for anaphylaxis by his acute onset respiratory compromise and facial and tongue edema. The intensity, timbre, and timing of a patient's wheeze can help to localize the site of obstruction. Stridor, a loud monophonic inspiratory wheeze, reflects narrowing of extra thoracic large airways and risk of impending airway collapse that requires quick action. Expiratory polyphonic wheezes reflect dynamic compression of the large, more central airways such as the mainstem and lobar bronchi, whereas monophonic wheezes reflect disease in small bronchioles and terminal airways such as in asthma. Subtle facial and tongue edema can be difficult to appreciate without multiple reference points. Family members' recognition of the patient's facial edema during a period of transition in care teams helped guide the timely diagnosis and management of the hypersensitivity reaction over other considerations such as upper airway compression from plasmacytoma and cardiac wheeze from heart failure, and led to clinical improvement in the patient's symptoms.

THE PARADOX OF A RISING CD4: HYPERTHYROIDISM IN HIV PATIENTS ON COMBINED ANTIRETROVIRALS Emory Hsu¹; Minh Nguyen². ¹Emory University, Atlanta, GA; ²Emory University SOM, Atlanta, GA. (Tracking ID #2199403)

LEARNING OBJECTIVE #1: Recognize the risk of autoimmune hyperthyroidism in HIV patients treated with combined antiretroviral therapy (cART)

LEARNING OBJECTIVE #2: Recognize that unlike other immune reconstitution inflammatory syndromes (IRIS), Grave's disease due to immune restoration (G-IRD) can occur years after cART initiation and is not associated with increased inflammatory markers

CASE: A 38 year old Black male diagnosed with HIV 7 years prior, presented for care with a nadir CD4 T-cell count of 3 cells/uL. He was started on combination highly active antiretroviral therapy (cART) of efavirenz-etrizabine-tenofovir, with good medication adherence. He presented 23 months later with heat intolerance, palpitations, tremors, mild weight loss, and breast tenderness. Physical exam demonstrated enlarged thyroid, bilateral gynecomastia, a fine resting tremor, and irregularly irregular heart rate. His CD4 count was 486 cells/mL, TSH 0.016 IU/mL, free thyroxine (fT4) of 3.87 (normal 0.6–1.6 ng/dL), and triiodothyronine (T3) of 425 (normal 87–178 ng/dL). Further workup including pituitary hormones was unremarkable. He was treated with methimazole 20 mg daily and metoprolol XL 25 mg daily leading to normalization of fT4 and complete resolution of symptoms after 3 months, with plans to continue monitoring. During the same year in our clinic, a total of 7 HIV infected individuals - 6 female, 6 Black, all without previous history of thyroid disorder - developed Graves' immune restoration disease (G-IRD). At the time of initiation of cART, these patients had a median (range) baseline CD4 count of 12 (3–47) cells/uL, followed by an interval of 48 (23–97) months on cART until diagnosis of hyperthyroidism, with a CD4 count of 492 (170–728) and a TSH of 0.026 (0.014–0.095) IU/mL at the time of G-IRD diagnosis.

DISCUSSION: Graves' disease is a common autoimmune thyroid disorder, primarily in middle-age females, caused by autoantibodies to the thyroid stimulating hormone receptor (TSHR), with common presenting signs and symptoms including anxiety, tremor, weight loss, heat intolerance, diarrhea, palpitations, and proptosis. Diagnosis is confirmed through presence of TSHR and thyroid peroxidase antibodies. The majority of Graves' cases are idiopathic, but immune restoration (also called reconstitution) has been identified as a cause of Graves' disease. Our series of HIV-infected patients who developed Graves' disease raises the need for awareness of autoimmune hyperthyroidism as a potential long-term sequelae of cART. The first reported cases of Graves' disease in patients on cART (Gilquin 1998) occurred 16–22 months after initiation of therapy. Additional cases have been reported since (Rasul 2011; Crum 2006; Chen 2005). Reports suggest that HIV-associated Graves' disease is an immune restoration disease (G-IRD), similar to immune reconstitution inflammatory syndrome (IRIS). IRIS typically occurs within 6 months of memory T-cell recovery after initiation of cART, thought to be an exaggerated response of a recovering immune system to a foreign antigen. However, G-IRD often occurs later, usually 1–3 years after cART. Aberrant B-cell and T-cell recovery allows autoantibodies to TSHR to proliferate. The exact mechanism by which this occurs - in both idiopathic Graves' disease and in G-IRD—is still unclear. However, in G-IRD, there appears to be an absence of the inflammatory cytokines that characterizes IRIS. Rather, it is likely mediated through Th2 immune response through CD4 expansion. Longitudinal work involving 7 patients and matched controls found increased proportions of naïve CD4+ T cells and non-thyroid related autoantibody titers in G-IRD. IRIS, in contrast, involves memory CD4+ T cells. It is postulated that perhaps the migration of naïve CD4 cells from the thymus is responsible for the late presentation of G-IRD. (Sheikh 2014) Given the limited number of patients, it remains unclear whether G-IRD is more common in women as is the conventional (idiopathic) form. Treatment of G-IRD is similar to that of conventional Graves', initially with antithyroid medication such as methimazole, and symptomatic medications as needed such as beta-blockers (Weetman 2009). In general, patients can continue to

receive cART. A consultation with an endocrinologist is warranted to discuss definitive treatment such as radioactive iodide thyroid ablation or thyroidectomy. In the era of antiretrovirals, primary care physicians must be cognizant of autoimmune disorders arising as a consequence of immune system recovery. While these autoimmune disorders most commonly involve gastrointestinal and dermatologic findings, Graves' disease is one such immune-related adverse event, and can occur months to years after cART initiation. Further studies are needed to elucidate predictors of G-IRD development in cART-treated HIV patients.

THE SEIZURES MAY BE PSYCHOGENIC, BUT THE CALCIUM IS REAL Angela Arbach; Nidhi Agrawal; Jennifer Ogilvie; Michael Janjigian; Jennifer Adams. NYU School of Medicine, New York, NY. (Tracking ID #2196530)

LEARNING OBJECTIVE #1: Formulate a differential diagnosis for hyperparathyroidism

CASE: A 45 year-old woman presented after a witnessed seizure. She had a history of non-epileptic seizures, diabetes mellitus, bipolar disorder, and parathyroidectomy 10 years prior for parathyroid adenoma. Three weeks prior to admission, she was seen in clinic for lower extremity edema, which was treated with furosemide. A week later, she went to the emergency room with the chief complaint of fatigue, constipation, and "feeling unwell", with labs significant for hypercalcemia. She was hydrated and discharged for outpatient workup but was readmitted under our care after having a non-epileptic seizure in the endocrine surgery clinic. She had no history of calcium supplementation, renal stones, chronic infections, or malignancies. On physical exam, she was obese, with poor attention. She had a left-sided, well-healed transverse cervical incision with no appreciable thyromegaly or other neck masses. Her calcium level was 13.6 mg/dL, phosphorus 2.2 mg/dL, PTH 395 pg/mL, PTH-rp <0.74 pmol/L, creatinine 0.6 mg/dL, and Vit D 9.6 ng/mL. Thyroid ultrasound revealed small sub-centimeter thyroid nodules with no evidence of parathyroid enlargement. Sestamibi parathyroid scan was without abnormalities. CT scan of the neck revealed sub-centimeter nodular foci in the right pre-tracheal and left para-esophageal regions. Despite treatment with pamidronate, the patient continued to have symptomatic hypercalcemia and underwent exploratory parathyroidectomy with intra-operative PTH monitoring. She was found to have parathyromatosis, with diffuse seeding of parathyroid tissue over the entire left thyroid lobe, which was also encased in scar tissue. After a left thyroid lobectomy, her intraoperative PTH level decreased from 454 to 39 pg/mL, and her post-operative calcium levels have been 9.0–9.9 mg/dL.

DISCUSSION: The etiologies of hypercalcemia are numerous and include primary hyperparathyroidism, malignancy, vitamin D excess, increased bone turnover, and medication side effects. Laboratory studies, such as PTH and calcium levels, can help clarify this differential. Primary hyperparathyroidism and malignancy account for over 90 % of cases of hypercalcemia, and an elevated or high-normal PTH greatly favors the diagnosis of the former. Imaging studies, while not indicated for diagnosis, may assist surgical intervention by localizing disease. Parathyroid adenomas are the cause of most cases of primary hyperparathyroidism, and focused parathyroidectomy by experienced surgeons has a cure rate over 95 %. Persistent or recurrent hypercalcemia following parathyroidectomy is most commonly associated with missed adenoma and surgeon inexperience, multiple gland disease, supernumerary or ectopic parathyroids, parathyroid carcinoma, and parathyromatosis. Parathyromatosis may occur from inadvertent seeding of benign parathyroid tissue during previous parathyroidectomy, which scatters hyperfunctioning parathyroid tissue throughout the neck, making diagnosis and treatment particularly difficult. The time from prior parathyroidectomy to newly diagnosed parathyromatosis can span years. In most cases, surgery cannot cure parathyromatosis, and patients are medically managed with therapies that are not well established, including calcimimetics and bisphosphonates. Our case demonstrates a disease that, although rarely documented, may prove to be an underdiagnosed cause of recurrent hyperparathyroidism.

THE SEVEN-YEAR LIVER MASS: AN UNCOMMON MANIFESTATION OF A COMMON DISEASE Neal Yuan¹; Leslie Sheu²; Rene Salazar². ¹University of California, San Francisco, Walnut Creek, CA; ²University of California, San Francisco, San Francisco, CA. (Tracking ID #2179474)

LEARNING OBJECTIVE #1: Generate a differential diagnosis for hepatic granulomas

LEARNING OBJECTIVE #2: Learn the epidemiology and presentation of hepatic tuberculosis (TB)

CASE: A previously healthy 25 year-old woman with a 7-year history of a known liver mass presented to our hospital with worsening right upper quadrant abdominal cramping. She denied fevers, chills, or other constitutional symptoms. She had no diarrhea, constipation, but endorsed a 20-pound weight loss within the last 6 months. The first episode of her abdominal pain began 7 years ago and self-resolved while she was living in the Philippines. After moving to the United States 2 years later, she re-developed these

symptoms and underwent abdominal imaging. MRI revealed a heterogeneous right liver lobe mass with partially cystic focal lesions, punctate calcifications, and peripheral biliary duct dilatation, suspicious for malignancy. The patient was unfortunately lost to follow-up until presenting to our institution. At our hospital, the patient was afebrile with lab values significant for aspartate transaminase (AST) and alanine transaminase (ALT) levels in the 200 s, alkaline phosphatase (ALP) of 300, but normal total bilirubin levels. Liver synthetic functions were also normal. An MRI revealed a large infiltrating mass that had grown from 5 years prior. Positron Emission Tomography (PET) showed that the liver lesion was PET-avid and also uncovered a PET-avid pulmonary hilar node. A CT demonstrated small pulmonary nodules in the upper lobes bilaterally. The patient had negative serum tests for HIV, coccidioides, cryptococcus, histoplasma, and hepatitis A, B, and C. A QuantiFERON-TB Gold (Cellestis, Carnegie, Australia) assay was positive. Serial sputum smears were negative for acid-fast bacilli. The differential diagnosis at the time included cholangiocarcinoma, hemangioendothelioma, and other hepatic malignancies. TB, fungal, and indolent bacterial infections were also considered. An ultrasound-guided liver biopsy was obtained. Both stains and cultures were negative for bacteria, acid-fast bacilli, and fungi. Pathologic examination of the specimen revealed many granulomas with small focal necrosis and no evidence of malignancy. The patient was empirically started on rifampin, isoniazid, pyrazinamide, and ethambutol. Polymerase chain reaction (PCR) analysis of biopsy samples later returned positive for *Mycobacterium tuberculosis*.

DISCUSSION: Although known best for its pulmonary manifestations, TB infects the liver through hematogenous spread in 1.2 to 15.7 % of TB cases. While this most commonly presents in the setting of disseminated TB, isolated hepatic TB is extremely rare and exists on the case report level. Symptoms of hepatic TB are non-specific and can include hepatomegaly, fever, weight loss, and abdominal pain. Liver function tests often show an infiltrative pattern with high ALP without concomitant elevated bilirubin. AST and ALT may also be mildly increased. Other documented laboratory abnormalities include hyponatremia, hypergammaglobulinemia, and signs of liver synthetic dysfunction. A positive tuberculin skin test or interferon gamma release assay can support a TB diagnosis but is unable to distinguish among current, latent, and previously cleared infections. They are therefore less helpful if the patient is from a TB-endemic region. In addition to producing non-specific signs and symptoms, hepatic TB masses are often difficult to interpret on imaging, exhibiting multiple coexisting pathologic states including necrosis, fibrosis, and calcification. They are frequently suspicious for malignancies. A liver biopsy is necessary for diagnosis and can spare certain patients unnecessary surgery for suspected cancer. While Ziehl-Neelsen staining and AFB culture can have low sensitivities for TB (0–45 and 10–60 % respectively), pathologic analysis of biopsy specimens often reveals granulomas with or without caseation. The differential for granulomas in the liver includes autoimmune diseases (sarcoidosis, primary biliary cirrhosis), infections (TB, cryptococcus, Q fever, brucellosis), malignancies (lymphoma, renal cell carcinoma), and drug reactions. In cases where there is a high suspicion for TB despite negative stains and cultures, empiric treatment and PCR diagnosis should be considered. Treatment for hepatic TB is often with rifampin, isoniazid, pyrazinamide, and ethambutol for at least a year. The liver toxicity of these medications should prompt close monitoring and may even raise consideration of alternative regimens such as those involving fluoroquinolones, which have been used in post liver transplant cases. Patients will often experience significant clinical improvement within weeks to months of therapy. Guidelines on repeat imaging to ensure resolution do not exist and are done on a case-by-case basis. Secondary malignancy in the setting of hepatic TB is extremely rare.

THE SKIN RASH THAT WAS NOT A RASH—EXTENSION OF T-CELL PROLYMPHOCYTIC LEUKEMIA INTO THE SKIN Akshay Amaraneni; Devin B. Malik. Western Michigan University School of Medicine, Kalamazoo, MI. (Tracking ID #2194169)

LEARNING OBJECTIVE #1: Understand that T-cell Prolymphocytic Leukemia is a rare leukemia that can present similar to B-cell Chronic lymphocytic leukemia and is differentiated best by flow cytometry.

LEARNING OBJECTIVE #2: Recognize the indications for treatment in T-Cell PLL, Skin involvement being one of them.

CASE: A 75-year-old man was referred to a hematologist following consecutive, routine complete blood counts showing a lymphocytosis of 19,200 cells/microliter. Given the patient's age and indolent presentation, Chronic Lymphocytic Leukemia was suspected. The patient's medical history was significant for hypertension, diabetes mellitus type 2. His surgical history was unremarkable. He had a long medication list that included lisinopril, hydrochlorothiazide, subcutaneous insulin and donepezil. The patient is a retired aerospace engineer and had a 10-pack year smoking history but last smoked in 1959. His family history was unremarkable. Physical examination revealed pre and post-auricular lymphadenopathy along with right upper cervical, left lower cervical and infraclavicular lymphadenopathy but was otherwise normal. Flow cytometry was performed on peripheral blood and revealed >90 % T cell involvement with CD2, CD3, CD4, CD5 (atypically

bright), CD7, CD19, CD45 and CD52 positive. FISH showed a rearrangement of TCL1A rearrangement on chromosome 14. This profile is diagnostic of T-Cell PLL. Two months later, the patient developed a diffuse, non-blanching, maculopapular skin rash that appeared over his neck, chest and back. It was not known what the rash was as he had not started any new medication and did not appear to be allergic. A skin biopsy was performed that showed lymphocyte infiltration in the dermis that stained positive for CD4. This is consistent with T-Cell PLL infiltration of the skin. The patient was started on mini-R-CHOP (Rituximab, cyclophosphamide, Adriamycin, vincristine and prednisone) therapy. The patient progressed on this regimen with his lymphocyte count eventually reaching 72,000 cells/microliter. He was then started on Alemtuzumab, a biologic agent that is a monoclonal antibody to CD52. Follow up appointments revealed that the patient's lymphadenopathy and rash resolved and his most recent lymphocyte count was 5000 cells/microliter.

DISCUSSION: T-Cell prolymphocytic leukemia (T-Cell PLL) is a rare post-thymic T-cell leukemia. Because the cancer is so infrequently encountered even by hematologists, it is often misdiagnosed and as a result can lead to incorrect treatment and management. We present a case of a 75-year-old man who presented with a peripheral T-cell leukemia and eventually developed a mysterious skin rash. Flow Cytometry findings are important in this case as they help differentiate between a T-cell leukemia and B-cell leukemia when peripheral smear or bone marrow biopsy is not diagnostic. Special stains are also useful in the differentiation of the two, however not enough to establish a true diagnosis. Flow cytometry also gave us another important characteristic in this case, the presence of the CD52 marker on the T-cells. The importance of this marker is for the use of Alemtuzumab, which is a biologic monoclonal antibody against CD52 that is shown to improve survival in T-cell PLL patients. T-Cell PLL accounts for just 2 % of all leukemias. One fifth of patients will go on to develop skin manifestations with fewer having pleural effusion or CNS involvement. The skin manifestation is important because it is a direct extension of the PLL and not a paraneoplastic dermatosis. Indications for treatment include constitutional symptoms, bulky lymphadenopathy, symptomatic anemia, thrombocytopenia, skin or CNS involvement, pleural effusion related to the disease or demonstration of quick progression. Once he developed skin manifestations, the patient was quickly treated. This case also highlights the importance of flow cytometry and FISH in the diagnosis of leukemia and lymphoma.

THE SWEET SIDE OF ISONIAZID: MANAGING A DRUG INTERACTION IN AN INTERPROFESSIONAL TRAINING CLINIC Megan S. Lemay^{1, 2}; Katherine Hofstetter². ¹Yale-New Haven Hospital, New Haven, CT; ²West Haven VA Hospital Center of Excellence in Primary Care Education, West Haven, CT. (Tracking ID #2198845)

LEARNING OBJECTIVE #1: Identify the potential interaction between isoniazid and sulfonylureas that may lead to hyperglycemia in diabetic patients

LEARNING OBJECTIVE #2: Identify potential roles of other disciplines, team work, and interprofessional clinical training for the mutual care of complex patients

CASE: Mr. H is a 67 year old male veteran with a history of type 2 diabetes mellitus, obesity, depression, and recently diagnosed latent tuberculosis infection. Over the past year, his hemoglobin A1C had increased from 7.6 to 9.6 %. His primary care provider (a nurse practitioner fellow) added glipizide to metformin to control his hyperglycemia. The patient recorded fasting blood glucose levels of 100–170 on this regimen. The veteran then had a PPD placed which resulted in 10 mm of induration. He had no symptoms of active TB infection and a normal chest x ray. Isoniazid was initiated for treatment of latent TB infection. Six weeks into his therapy, he presented with hyperglycemia. He noted morning fasting blood glucose levels of 230–350 and was experiencing polyuria and polydipsia. During the clinic encounter, the NP fellow precepted with her NP supervisor and an MD chief resident. Together, they identified a potential drug-drug interaction between isoniazid and sulfonylureas. They consulted with the pharmacist and pharmacy trainee present in the same precepting room who recommended discontinuing glipizide. Within the primary care clinic, they were able to work with a pharmacist, pharmacy trainees, and the patient aligned care team (PACT) nurse to start the veteran on insulin glargine. The veteran was able to continue isoniazid therapy and now has a hemoglobin A1C of 6.1 %.

DISCUSSION: Isoniazid (INH) is known to cause metabolic derangements and hepatotoxicity. It is thought to cause hyperglycemia (even in non-diabetic patients) by stimulating the release of glucagon and inhibiting the release of insulin from pancreatic beta cells. This directly antagonizes the action of sulfonylureas, which exert their primary hypoglycemic action by stimulating pancreatic insulin release. Isoniazid therapy for latent TB infection is recommended for 9 months. Therefore, patients beginning this therapy, especially those with diabetes, should be monitored for hyperglycemia. Often, oral hypoglycemic medications need to be stopped and insulin therapy initiated to maintain glycemic control. This complicated scenario was managed with multiple disciplines within the West Haven VA Primary Care Center of Excellence (CoE) in Primary Care Education. The CoE is a unique training environment for internal medicine residents as they learn alongside trainees from

other disciplines (including nurse practitioner fellows, pharmacy residents, and health psychology fellows). Residents are supervised by and precept with nurse practitioner faculty. Likewise, nurse practitioner trainees work with MD faculty. Within this training environment, pharmacists and pharmacy trainees are available directly in the precepting space to listen to trainee presentations and offer guidance. Patients are able to experience a “warm hand off” wherein the NP or MD trainee seeing the patient in primary care clinic can introduce the patient to another team member (such as a pharmacy or mental health trainee) to assist in management without the patient even needing to leave the room. The CoE also places importance on sustained longitudinal relationships (for patients and between disciplines) to ensure that patients are followed long term by the entire team. Nurses and health technicians are also an equal voice in team structure and changes and actively follow patients on their team. With this model of teamwork and interdisciplinary care, this veteran was able to complete treatment for latent TB infection while attaining superior glycemic control.

THE TELL-TALE HEART: A CASE OF GROUP B STREPTOCOCCUS (GBS) ENDOCARDITIS PRESENTING AS COMPLETE HEART BLOCK Amceera Ahmed; Daniel S. Zhang; I-Hui Chiang. Baylor College of Medicine, Houston, TX. (Tracking ID #2199240)

LEARNING OBJECTIVE #1: Recognize that the rate of invasive Group B Streptococcus (GBS) infections is rising in non-pregnant adults particularly in the elderly

LEARNING OBJECTIVE #2: Identify GBS as a rare pathogen causing destructive native valve infective endocarditis and treat with antibiotics and early cardiac surgery

CASE: A 62 year old Caucasian male with well controlled chronic obstructive pulmonary disease, diabetes and hypertension presented with progressive dyspnea on exertion. He had noted productive cough, fevers, congestion, shortness of breath and wheezing 2 weeks prior to admission. All the symptoms had resolved except the fevers and shortness of breath that had continued to worsen. The patient said that at baseline he was able to walk about a mile but now walking to the bathroom left him winded. He denied recent travel. His roommate had been sick with him. Vitals showed that he was febrile and bradycardic with normal blood pressure. Physical exam revealed lower extremity edema, crackles at lung bases and a new III/VI systolic murmur at the apex. EKG showed complete heart block. Laboratory studies were significant for leukocytosis. Blood cultures grew 4/4 bottles of GBS. Echo showed a 8×4 mm mobile mass on the mitral valve, possible aortic root abscess with preserved ejection fraction. Coronary angiography was notable for chronic total occlusion of the right coronary artery. He was started on ceftriaxone and gentamicin and a temporary trans-venous pacemaker was placed.

DISCUSSION: GBS was long thought of causing infections more commonly in pregnant women and neonates. However now it is increasingly recognized as a cause of bacteremia without a focus, sepsis, soft tissue infections, infectious endocarditis, urinary tract and central nervous system infections in non-pregnant adults. It affects elderly adults more commonly with the case fatality rate for elderly adults being estimated at 15 %. Increased rates of skin, rectum, and pharyngeal carriage are seen in nursing home residents and men who have sex with men. In the pre-antibiotic era, most cases of GBS infective endocarditis were seen in pregnant women usually with prior rheumatic heart disease. At the time mortality rate was almost 100 %. Several recent studies have shown that GBS infective endocarditis now usually occurs in older patients, with a ratio of male to female patients of 1:1. There is an association between GBS infective endocarditis and chronic systemic diseases, such as alcoholism, diabetes mellitus, cirrhosis, cancer and HIV infection. GBS infective endocarditis has been compared to staphylococcus endocarditis given its propensity to infect and rapidly destroy native valves. In one review the incidence of emboli was 50 and 40 % of patients underwent cardiac surgery because of extensive valve destruction. GBS isolates have traditionally been uniformly penicillin-sensitive. However, there is greater penicillin resistance seen with GBS than with group A streptococcus. Some authors recommend the addition of gentamicin to penicillin or a cephalosporin for at least the first 2 weeks of a 4 to 6 week course of antimicrobial therapy. Data suggests that that early cardiac surgery has improved overall survival rates among more recently treated patients as compared with patients treated in the past.

THE UNUSUAL CASE OF SEVERE ABDOMINAL PAIN Andrey A. Samal¹; Armen Simonian². ¹Capital Health Regional Medical Center, Trenton, NJ; ²Capital Health Center, Pennington, NJ. (Tracking ID #2159090)

LEARNING OBJECTIVE #1: Diagnose small bowel ischemia based on HPI and risk factors, recognize that LDH, bicarbonate and initial abdominal CTA may remain normal on presentation.

LEARNING OBJECTIVE #2: Be aware that prompt surgical intervention is proven to be the only life-saving procedure in patients with acute small bowel ischemia.

CASE: This is a 65-year-old overweight Caucasian male with PMH of HTN, erectile dysfunction, two myocardial infarctions status post two stents and a CABG who presented with intense abdominal pain that began abruptly and shortly after eating breakfast. In the ED he was found to have a markedly elevated blood pressure (204/118) and a CTA of the chest and abdomen, EKG, LDH and troponins were ordered but came back nondiagnostic. His hemoglobin was found to be 17.5, WBC of 8.9, BUN was 18, creatinine was 1.1 and bicarbonate was 20. The patient was started on IV fluids and pain medications. A Cardene drip was initiated. The next day the patient's white count increased to 15.8 and was associated with a neutrophilia (91 %) and no bandemia. The patient was started empirically on Zosyn, as initially, his symptoms were attributed to acute cholecystitis since abdominal ultrasound showed multiple gallstones with slightly thickened gallbladder wall measuring 4 mm and positive Murphy's sign. The HIDA scan, however, was non-conclusive for acute cholecystitis, and despite the aggressive pain management, the patient's condition did not improve. He still experienced severe abdominal pain, out of proportion to physical findings. Upon further questioning the patient reported having mild intermittent abdominal discomfort for the last several years within 30 min post-meal that made him decrease the amount of food intake and eat more frequently. The patient admitted weight loss of 55 lb over last 6 months. This new information strongly indicated possible bowel ischemia, although normal LDH and bicarbonate argued against it (597 and 25 respectively). A follow up CTA abdomen and pelvis showed signs of possible small bowel wall pneumatosis. This finding along with severe abdominal pain out of proportion to his physical examination, a silent abdomen, and hemoconcentration combined with a PMH of CAD strongly suggested small bowel ischemia. The patient was emergently taken to OR for an exploratory laparotomy and upon discovery of a necrotic segment of jejunum underwent a small bowel resection. The patient tolerated the procedure well. He was started on heparin drip with transition to Coumadin to prevent possible thrombosis. His overall condition gradually improved. The diet was gradually advanced with no abdominal symptoms. He remained in the hospital until therapeutic INR was achieved. The rest of his hospitalization was unremarkable. The INR on discharge was 2.5.

DISCUSSION: Aggressive intervention, diagnostic and surgical, tends to be the only life-saving approach in the management of acute on chronic ischemic bowel syndrome. In the above intricate case the history of CAD and erectile dysfunction were indicators of systemic atherosclerosis with possible mesenteric arterial involvement, but its presentation, initial CTA and negative LDH combined with a normal bicarbonate level argued against mesenteric ischemia. Fortunately for the patient, the diagnosis of mesenteric ischemia was considered in a timely fashion prompting repeat radiographic imaging. This led to his expedited surgery with confirmation and proper treatment of this potentially life threatening condition.

THE WORMS INSIDE ME: A CASE OF *STRONGYLOIDES* HYPERINFECTION SYNDROME PRESENTING WITH MENINGITIS AND INTESTINAL PERFORATION Yumi Ando; Celia M. Divino; Gopi Patel. Mount Sinai Hospital, New York, NY. (Tracking ID #2167247)

LEARNING OBJECTIVE #1: Identify possible *Strongyloides* hyperinfection syndrome in patients from endemic areas receiving immunosuppressants.

LEARNING OBJECTIVE #2: Recognize the potential role of screening for *Strongyloides* prior to initiating immunosuppressants in patients from endemic areas.

CASE: An 81-year-old Puerto Rican man presented with several days of fever, lethargy, and confusion. His medical history was significant for chronic obstructive pulmonary disease with frequent exacerbations requiring systemic glucocorticoid therapy. He had no sick contacts and had not been out of New York since moving from Puerto Rico 10 years ago. Vital signs were notable for fever, tachycardia, and hypotension. On examination, he was somnolent and only oriented to self. He was also noted to have nuchal rigidity and mild epigastric tenderness. Rectal exam revealed guaiac positive brown stool. Blood tests revealed leukocytosis of $12.6 \times 10^3/\mu\text{L}$ with neutrophilic predominance and no eosinophilia. Cerebral spinal fluid examination was notable for 280/ μL white blood cells with 77 % polymorphonuclear cells, elevated protein, and low glucose consistent with bacterial meningitis. The CSF Gram-stain did not reveal any organisms. Blood and CSF cultures were negative. The patient was started on dexamethasone and broad-spectrum antibiotics for bacterial meningitis. On hospital day two, the patient's mental status improved but he developed an acute abdomen. Emergent exploratory laparotomy revealed an intestinal perforation transecting 75 % of the diameter of the duodenum. Histopathologic examination of the duodenum demonstrated deep fissuring ulcers and larvae consistent with *Strongyloides stercoralis*.

DISCUSSION: Initially, the patient in this case appeared to exhibit two unrelated disease processes -bacterial meningitis and intestinal perforation secondary to a duodenal ulcer. However, both processes are potential manifestations of *Strongyloides* hyperinfection syndrome. Strongyloidiasis is endemic in tropical and subtropical regions including the Southeastern United States. In healthy individuals symptoms are often mild and self-

limited. However, *Strongyloides* has the unique ability to autoinfect their host and latent infection can persist without directed treatment. Thus, even a remote history of living in an endemic area should raise the possibility of subclinical *Strongyloides* infection. In hyperinfection syndrome, the autoinfection process is accelerated. This causes direct organ and blood vessel damage resulting in bronchospasm, hemoptysis, acute respiratory distress syndrome, intestinal ulceration, and diffuse purpuric rash. It also causes secondary bacterial infections from enteric bacteria tracking with the disseminating larvae, which manifests as bacteremia, meningitis, and pneumonia. Eosinophilia, although considered a hallmark of parasitic infections, is rare in the setting of hyperinfection. Because the clinical features are nonspecific, obtaining a thorough epidemiological history of the patient and maintaining a high index of suspicion is needed for early diagnosis. Corticosteroid use is highly associated with the development of the hyperinfection syndrome. A review of the literature suggests that there is wide variability in dose and duration of glucocorticoid therapy prior to development of the hyperinfection syndrome. Thus, it is suggested that physicians maintain a low threshold for screening patients for *Strongyloides* using stool ova and parasite examination and/or serologies prior to starting immunosuppressive therapies.

THINK OUTSIDE THE BOX: A 31 YEAR OLD MALE WITH FEVERS AND MYALGIAS Hachem Nasri; Elyse Love; Leon Bemal-Mizrachi. Emory University, Atlanta, GA. (Tracking ID #2196072)

LEARNING OBJECTIVE #1: Recognize the rare presentation of a common disease, like multiple myeloma (renal failure, hypercalcemia, lytic lesions and anemia), in a younger population.

LEARNING OBJECTIVE #2: Carefully assess the value of ordering a wide array of expensive and extensive tests (like viral panels and vitamin levels) in a subacute illness

CASE: A 31 year-old previously healthy African-American male presented with a vague complaint of "feeling terrible" for 3 days. He complained of diffuse non-radiating abdominal discomfort, ongoing for 3 days prior to his presentation, associated with non-bilious non-bloody vomiting, but no diarrhea. In addition, he reported 1 week history of rhinorrhea, fevers, and severe generalized myalgias. Review of systems was notable for decreased exercise tolerance over the past 3 months as well as a 15 lb unintentional weight loss, but he had no cough, change in urine output, night sweats, or anorexia. He had no travel history, sick contacts or tick exposure, and was only taking a multi-vitamin daily. His family history was negative for any malignancy or autoimmune diseases, and the patient denied any high-risk behaviour. On exam, he was well appearing with a body mass index of 23, a pulse of 114 beats per minutes and a temperature of 38.4 °C. His blood pressure was 125/82 mmHg and he was breathing comfortably on room air. Otherwise he had no oral thrush, no lymphadenopathy, and no cardiac murmurs. His abdomen was mildly tender but without rebound tenderness, and he had moderate tenderness to palpation of the bilateral thighs and arms, but no associated motor weakness or skin rashes. Initial labs showed WBC: 5100 cells/mcL, Hgb: 8.2 g/dL, MCV: 77 fL, BUN: 45 mg/dL, Cr: 7.3 mg/dL, Ca: 11.8 mg/dL, CPK: 3042 u/L, serum Total Protein: 7.5 g/dL, Albumin: 4.2 g/dL, and ESR: 75 mm/hr. Urinalysis came back with 2+ protein (>100 mg/dL), 3+ hemoglobin (>1 mg/dL), and no RBC casts. His liver function tests were normal, and his HIV and ANA tests were both negative. In the setting of fever, non-oliguric acute renal failure, moderate rhabdomyolysis, microcytic anemia, and hypercalcemia the differential in a previously healthy 31 year old was broad. This included viral etiologies (especially with fever and upper respiratory tract infection symptoms), vitamin toxicity (given his daily intake of multi-vitamins) or occult malignancy. On admission, an extensive viral panel and various vitamin levels were sent, all of which eventually came back negative. After an expensive initial workup and aggressive IV hydration, his hypercalcemia was not improving and his renal failure continued to worsen. A renal ultrasound showed only increased renal echogenicity bilaterally, but a serum and urine electrophoresis revealed atypical protein bands in the anodal gamma (serum) and beta (urine) zones, as well as IgG kappa and free kappa light chains. Bone marrow biopsy showed diffuse plasma cell infiltrate (>80 % plasma cells) with mild rouleaux formation on peripheral smear, and skeletal survey showed multiple ill-defined lucencies within the bilateral pubic rami consistent with myelomatous lesions. His serum Free Kappa was significantly elevated at 27,980 mg/L with a Kappa/Lambda ratio >1000 and his Beta-2 Microglobulin was 21.5 mg/L. Patient was diagnosed with Stage 3 Multiple Myeloma, based on International Staging System (ISS). Eventually he was started on Bortezomib and Dexamethasone as an inpatient, his hypercalcemia trended down, his kidney function improved, and he was discharged to follow up in clinic. Twelve months later, he is still receiving chemotherapy and is now status post second autologous bone marrow transplant.

DISCUSSION: There have been very few reports of multiple myeloma in patients younger than 30 years. Ludwig et al., in 2008, reported that 3 % of patients diagnosed with Multiple Myeloma were less than 40 years and only 0.26 % were younger than 30. However, it has been reported that only few young patients present with less favorable prognostic factors (anemia, renal impairment, or higher stage at diagnosis) when compared to older patients. Our patient presented with poor prognostic factors (elevated Beta-2

Microglobulin, serum Free Kappa >20,000, renal failure and ISS stage 3). In addition, his presentation was nonspecific, which made reaching a diagnosis more difficult. When this patient presented to the hospital, an extensive work-up was done searching for viral etiologies and vitamin toxicities as a unifying diagnosis. This led to subsequent anchoring bias and delay in the diagnosis of multiple myeloma in someone presenting with renal failure, hypercalcemia, and anemia, albeit normal serum total protein and albumin. Had this patient been an elderly male, the diagnosis would have seemed more obvious. Although it is important to establish a diagnosis early on, at times we have step back, take a look at the bigger picture and think outside the box.

THROMBOSIS IN A GIANT PULMONARY ARTERY ANEURYSM Cherinne Arundel^{1, 2}; Samah Nasserddine²; Jennifer Kerns^{1, 2}; Lakhmir Chawla^{1, 2}. ¹Washington DC Veterans Affairs Medical Center, Washington, DC; ²George Washington University, Washington, DC. (Tracking ID #2154076)

LEARNING OBJECTIVE #1: Diagnose pulmonary artery aneurysm and potential etiologies

LEARNING OBJECTIVE #2: Recognize the risk of thrombosis associated with pulmonary artery aneurysms

CASE: A 63 year old male patient with chronic obstructive pulmonary disease and chronic asymptomatic PAA presented with gradual worsening of shortness of breath over 2 months. The PAA of 4.4 cm had been incidentally discovered in 2001 on CT angiography (CTA) and subsequent CTAs showed a gradual increase in the size of the aneurysm to 7×6 cm in 2009. A right heart catheterization showed mild pulmonary hypertension with mean PA pressure of 26.6 mm Hg and pulmonary function testing demonstrated severe airflow obstruction with mild hypoxemia. The history, physical exam, and laboratory workup including a PET scan did not reveal any inflammatory, infectious or traumatic causes of the PAA (HLA B-27 was positive but without other features of collagen vascular disease, and RPR and quantiferon gold were negative). On this admission, physical exam revealed hypoxemia with SPO2 of 77 % on room air, rales at the left lung base, and an accentuated second heart sound. Repeat CTA showed an increase in size of the left PAA to 8.4×7.0×5.9 cm with an intraluminal thrombus occupying the PAA with an extensive endovascular filling defect extending into the right pulmonary artery and associated chronic pulmonary emboli. An agitated saline transthoracic echocardiogram revealed normal left ventricular systolic function and elevated right ventricular systolic pressure of 85 mm Hg. He was started on anticoagulation with low molecular weight heparin and bridged to warfarin. As for work up of his pulmonary embolism, the patient did not have signs of deep vein thrombosis; he denied any family or personal history of hypercoagulable state, and age appropriate cancer screening was negative. He was evaluated again by cardiothoracic surgery for possible repair; however, his surgical risk was deemed too high for operative intervention.

DISCUSSION: PAA is a rare condition and characterized as a vascular abnormality with focal dilatation of all three layers of the vessel wall. Most PAAs involve the main trunk of the pulmonary artery (80–85 %) with only 3 % involving the left branch. The causes of PAA are either congenital or acquired. Congenital causes are frequently related to cardiac anomalies (e.g., ductus arteriosus, atrial septal defect, ventral septal defect, or pulmonary valve stenosis) causing pulmonary hypertension. Secondary causes can be infectious in origin or related to structural arterial wall abnormalities from connective tissue diseases or vasculitis. Boyd et al. reviewed 111 autopsy cases of PAA and found that both genders were equally affected and the mean age was 37.7 years for women and 38.7 years for men¹. The clinical manifestations are nonspecific and include dyspnea, palpitations, chest pain, cough, fever, hemoptysis, hoarseness from compression of the laryngeal nerve, or symptoms from local compression^{1–3}. Complications include dissection and rupture which increase with the size of the PAA^{4–7}. Noninvasive imaging such as CT angiography or MRI imaging can help make the diagnosis⁸. Longitudinal data on the natural evolution of the disease are sparse.⁹ This case is unique given the size of the PAA, the longitudinal follow up of the patient, and associated rare complication of thrombosis. Thrombosis of the PAA has been described in Bechet's disease and is likely related to inflammation and endothelial injury, but it is exceedingly rare in other causes of PAA.^{10,11,12,13,14–17}. Serali et al. reported two cases of pulmonary embolism associated with PAA; however, neither patient had intraluminal thrombosis of the PAA¹⁰. Davutoglu et al. described the only case of PAA associated with chronic pulmonary thromboemboli and they postulate that the mechanism of thrombus formation was due to stasis of blood and endothelial dysfunction¹¹. An alternate hypothesis is that cystic medial degeneration even in the absence of connective tissue disease is an important factor in the pathogenesis of PAAs and may lead to increased hemodynamic forces and aneurysm formation^{18,19}. There are no clear management guidelines for PAA. Some have suggested surgery for enlarged aneurysms (>60 mm), those with symptoms of any size and right ventricular dysfunction or elevated pulmonary artery pressures^{20–22}. There is little guidance in the literature on the management of patients with PAA-associated thrombosis but all reported cases were treated with anticoagulation. Questions remain about the optimal follow up/frequency of imaging for

patients who opt for conservative management or who are not surgical candidates. Further data is also needed to determine the risk of thrombosis in patients with idiopathic pulmonary artery aneurysm and the possible benefit of anticoagulation for the primary prevention of thrombosis.

THROMBOTIC THROMBOCYTOPENIC PURPURA PRESENTING AS ACUTE PANCREATITIS Matthew R. Mohorek; Pinky Jha. Medical College of Wisconsin, Wauwatosa, WI. (*Tracking ID #2155887*)

LEARNING OBJECTIVE #1: Review the clinical manifestations of TTP.

LEARNING OBJECTIVE #2: Recognize that TTP can present as acute pancreatitis.

CASE: Fifty-five year-old female presented to OSH with 2-day history of abdominal pain and nausea. No significant PMH or medication use. ROS positive for unusual bruising that started 2 weeks ago. Lipase (208) was mildly elevated and CT abdomen showed extensive peripancreatic and retroperitoneal inflammatory edema concerning for acute pancreatitis, with no clear etiology. Severe thrombocytopenia was also present at admission (platelets = 8 k). Hb and WBC were within normal limits. Hematology was consulted and idiopathic thrombotic thrombocytopenic purpura diagnosed and treated with 60 mg prednisone. Over the next 36 h patient clinically declined: platelets remained critically low, hemoglobin began trending downward, and mental status progressively worsened eventually requiring intubation. CT of head showed no evidence of acute intracranial pathology. After reassessment, diagnosis of TTP was made. ADAMTS13 was obtained and patient transferred from OSH to tertiary medical center where plasmapheresis was available. Upon admission to MICU at tertiary medical center, patient was sedated, febrile, thrombocytopenic (platelets 12 k), and had signs of a microangiopathic hemolytic anemia (hemoglobin 9.9, LDH 1373, total bili 2.9, reticulocytosis and schistocytes). Plasmapheresis was immediately initiated. By day two of plasmapheresis, LDH had decreased to 502 and platelets increased to 31 k. Patient was extubated on day 3 but was aphasic. MRI of head showed a recent small left frontal lobe infarct along the pre-central sulcus. Despite this, by day five, patient had returned to baseline mental status and abdominal pain/nausea had fully resolved (lipase 38). On day six, patient suffered a minor reaction during plasma exchange with nausea, hives, and chills. Symptoms resolved and plasmapheresis was administered for two more days. In total, eight days of plasmapheresis were administered (day six held because of reaction concern). Patient was discharged on day nine in stable condition with discharge labs: platelets 327 k, Hb 7.3, LDH 211, indirect bilirubin .2, and plans for follow up with outpatient hematology two days later. ADAMTS13 activity came back at 6 %.

DISCUSSION: Thrombotic thrombocytopenic purpura (TTP) is a rare hematological disorder of platelet consumption that presents with thrombocytopenia, microangiopathic hemolytic anemia, fever, neurological symptoms and (less commonly) acute renal failure. Because the diagnosis of TTP is clinical, it must be made in a timely manner, as any delay in treatment can be life threatening. Here we report a case of TTP presenting as acute pancreatitis. The presenting clinical symptom of TTP is most commonly neurologic changes (60 %). Other common presenting clinical symptoms include: purpura/hemorrhage, malaise/fatigue/weakness, nausea/vomiting, and fever. TTP presenting with abdominal pain is uncommon (11 %) and abdominal pain secondary to acute pancreatitis, is even less common ~2 %. The cause of TTP is a deficiency in ADAMTS13, a von Willebrand factor-cleaving protease. When vWF multimers are secreted from vascular endothelial cells, ADAMTS13 normally functions as a protease for multimer break down. TTP occurs when there is a deficiency of ADAMTS13 either because of a hereditary deficiency (Upshaw-Schulman syndrome) or autoantibody destruction (acquired TTP). In the absence of ADAMTS13, large vWF multimers have an increased sensitivity to activate in small blood vessels because of shear forces present. Platelet activation in these small vessels leads to microthrombosis and a microangiopathic hemolytic anemia. An interesting debate within the realm of this topic is the cause/effect relationship between acute pancreatitis (AP) and TTP. The traditional understanding is that TTP can trigger AP by mechanical impairment of the pancreatic circulation by thrombotic occlusion of small vessels. There have been a number of recent case studies, however, that report AP as the trigger for TTP. The postulated mechanism in this case being that AP creates a systemic inflammatory response that release cytokines which stimulate endothelial cells to release multimers while simultaneously inhibiting ADAMTS13 multimer cleavage. Regardless of cause, TTP must be treated with plasmapheresis immediately. The treatment is effective in that it both removes patient plasma containing autoantibodies to ADAMTS13 and vWF multimers and infuses donor plasma containing ADAMTS13 protease. Before the use of plasmapheresis, likelihood of immediate survival after TTP diagnosis was 10 %. With plasmapheresis, latest reports suggest mortality to be as low as 9 %. This vast improvement in survival justifies a low threshold for starting plasmapheresis.

THYROID HORMONE RESISTANCE: A CASE REPORT Samaneh Dowlatshahi. Presence St Francis Hospital, Chicago, IL. (*Tracking ID #2193381*)

LEARNING OBJECTIVE #1: Resistance to thyroid hormone is a rare condition caused by tissue refractoriness to the effects of circulating thyroid hormone, and may be

misdiagnosed as hyperthyroidism. This syndrome is characterized by elevated circulating thyroid hormones, and unsuppressed TSH levels.

LEARNING OBJECTIVE #2: Although most patients are euthyroid, rarely they may present with clinical hyperthyroidism, if the pituitary gland is more insensitive than other tissues to thyroid hormones. In this study we present a case of thyroid hormone resistance with clinical evidence of hyperthyroidism.

CASE: A 58 year old male who suffered from thyrotoxicosis and diarrhea for many years and had been under treatment for atrial fibrillation with rate control medications. He had been tested for thyroid function in the past which revealed elevated FT3 and FT4 with slightly elevated TSH concentration. Pituitary adenoma was excluded as magnetic resonance imaging showed normal pituitary gland, alpha subunit was within normal range and TSH concentration increased after TRH administration. Sonography revealed normoechogenic, slightly enlarged thyroid gland. Methimazole had been tried in the past without any significant improvement. The diagnosis of thyroid hormone resistance was made and he was started on bromocriptine at a dose of 10 mg per day. After 2 months of treatment he achieved a state of constant euthyrosis and following next few months thyroid volume diminished.

DISCUSSION: Failure to differentiate thyroid hormone resistance from primary thyrotoxicosis has resulted in the inappropriate treatment of nearly one-third of patients. Also, the diagnosis allows appropriate genetic counselling, and initiation of treatment. In this case report we emphasize the importance of timely diagnosis of thyroid hormone resistance, which prevents many patients from being wrongly diagnosed as Graves disease and therefore various inappropriate treatments. Also, we present a successful treatment of this rare condition with bromocripten.

TIMING IS EVERYTHING Arshia A. Soleimani; Deepa Bhatnagar. Tulane University Health Sciences Center, New Orleans, LA. (*Tracking ID #2198530*)

LEARNING OBJECTIVE #1: Identify the differential diagnosis for precipitous development of thrombocytopenia

LEARNING OBJECTIVE #2: Discuss treatment options for these conditions

CASE: A 55 year old woman was admitted to the intensive care unit after a motor vehicle collision secondary to hemorrhagic cerebrovascular accident. She was noted to have a pulmonary embolism and deep vein thrombosis on day 2 of her hospitalization. Given the extensive thromboembolic disease, she was started on anticoagulation with heparin. Despite treatment with heparin, her lower deep vein thrombosis extended. Three days into the hospitalization, the patient received a blood transfusion due to blood loss during her multiple orthopedic surgeries. Nine days later, the patient developed a fever and elevated white blood cell count of 15,600/UL. She was started on vancomycin and piperacillin-tazobactam for empiric coverage of a possible hospital-acquired infection. The next morning, the platelet count precipitously dropped from 516,000/UL to 10,000/UL. On repeat labs platelet count was 7000/UL and hemoglobin remained stable at 7 GM/DL. No other medications were given in proximity to this event. Peripheral smear showed no schistocytes. Serotonin release assay in addition to IgG PF4 ELISA test were ordered to rule out Heparin induced thrombocytopenia (HIT). Suspicious medications such as heparin and vancomycin were discontinued. By the next day, platelets increased to 21,000 and a few days later the platelet count was within normal limits.

DISCUSSION: Thrombocytopenia is often encountered in hospitalized patients. Many patients are admitted with thrombocytopenia that may be due to a broad differential. However, the acute fall in platelets during hospitalization often have a narrower differential. Heparin induced thrombocytopenia (HIT) can happen precipitously but does usually result in a profound degree of thrombocytopenia. When the fall in platelets is severe and occurs over 1–2 days, the most likely culprits are drug induced immune thrombocytopenia (DITP), and post-transfusion purpura (PTP). In this case, HIT was considered on the differential as the patient's thromboses progressed while on therapeutic anticoagulation. However, the severity of the thrombocytopenia was not consistent with HIT. During HIT, Heparin binds to platelet factor-4 (PF4) and creates a complex where IgG antibodies bind and lead to the activation and consumption of platelets. Typically, the median platelet count nadir is 50,000-60,000/UL or a 30–50 % drop after heparin administration. HIT is frequently detected with the PF4 ELISA, which uncovers the HIT antibodies produced against the heparin PF4 complex. This test has a sensitivity of 98 %, but a lower positive predictive value, so often times HIT is confirmed by a serotonin release assay that reveals if a patient's serum can activate donor platelets in the setting or heparin. Both of these tests came back negative and made the diagnosis of HIT improbable. Next on the differential was PTP, a very rare and fatal thrombocytopenia that occurs 5 to 12 days after a blood transfusion. It usually occurs in multiparous women who are negative for an antigen on their platelets called HPA-1a but alloimmunized by their HPA-1a positive fetus. For reasons unknown, once these patients are transfused with blood products containing HPA-1a antigen, their own platelets precipitously drop, resulting in a count <10,000/UL. First line therapy is IVIG, but plasmapheresis or corticosteroids can also be effective

agents. Genotyping studies revealed that our patient was HPA-1a positive, so PTP was also quickly ruled out. By process of elimination, the main diagnostic consideration in this patient was DITP. This reaction is highlighted by drug dependant antibodies that lead to sudden thrombocytopenia with a platelet nadir <20,000. Numerous reports have established that vancomycin can be associated with rapid thrombocytopenia. Since, thrombocytopenia developed while patient was on vancomycin and improved and did not recur once the offending drug was discontinued, DITP best fit the clinical picture. A re-challenge test of vancomycin possibly could have confirmed the diagnosis. This case illustrates a narrowed approach to precipitous thrombocytopenia. Recognition of the sudden onset and severity of the thrombocytopenia puts the focus on 2 disorders and most importantly hastens appropriate and immediate intervention.

TO B OR NOT TO B ISLET CELLS—THE STORY OF LADA Camille M. Webb; Carla Spagnoletti. University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2198963)

LEARNING OBJECTIVE #1: Recognize clinical characteristics of LADA

LEARNING OBJECTIVE #2: Distinguish LADA from type 1 and type 2 diabetes mellitus

CASE: A 45-year-old man presented to the Emergency Department with nausea and weakness and was found to be in diabetic ketoacidosis. His past medical history was significant for diabetes diagnosed at age 41 with a hemoglobin A1c of 10.9 %. At that time he had been started on insulin and began tight diet control. Subsequently, after significant weight loss, he was transitioned to metformin 1 year prior to presentation to the ED, due to steadily declining insulin requirements and associated low hemoglobin A1c. While on metformin, his hemoglobin A1c ranged from 5.6 to 6.0 %. On presentation to the ED, heart rate was 107 beats per minute and blood pressure was 122/75 mmHg. Physical exam showed a well-nourished male in no apparent distress. Laboratory studies revealed a blood glucose of 601 mg/dL, serum osmolality of 300 mOsm/kg and anion gap of 16 mEq/L. Potassium was 5.9 mEq/L, sodium was 123 mEq/L and CO2 was 14 mEq/L. Urinalysis revealed ketones. Beta-hydroxybutyrate level was elevated at 1.84 mmol/L. He was admitted to medicine and started on an insulin drip, with rapid normalization of anion gap to 9 mEq/L, and of blood glucose to 130 mg/dL. Further laboratory studies revealed a hemoglobin A1c of 13.7 %, increased from 5.8 % over a period of 3 months. A C-peptide level was on lower end of normal at 1.15 ng/mL. Islet cell antibodies (ICA) were positive. He was diagnosed with latent autoimmune diabetes of adults (LADA). He was discharged on an insulin regimen with glargine 10 units daily and low dose insulin of 3 units before meals.

DISCUSSION: Latent autoimmune diabetes of adults (LADA) represents 2 to 12 % of patients with diabetes mellitus, and shares characteristics with both type 1 and type 2 diabetes mellitus. Patients with LADA have circulating antibodies towards beta cell antigens (islet cell antibodies or GAD65 antibodies) similar to type 1 diabetes, however present later in life, typically between ages of 30 and 50. At time of diagnosis, patients often have a brief period of insulin independence, which distinguishes LADA from type 1 diabetes. They are often misclassified as having type 2 diabetes, due to age of presentation and clinical characteristics. They then progress rapidly to insulin dependence and often ketoacidosis, as in the case of our patient. While patients with type 2 diabetes develop beta cell destruction over the course of several years, patients with LADA can develop beta cell destruction as early as the first 6 months after diagnosis due to the presence of antibodies. There is ongoing debate whether LADA represents a different entity from type 1 diabetes, and there is significant genetic overlap with both type 1 and type 2 diabetes. Currently, requirements for diagnosis are 1) presentation over the age of 30, 2) circulating antibodies and 3) initial insulin independence. Suspicion for atypical forms of diabetes should be raised in patients who have lower body mass indexes, other autoimmune diseases, no associated hypertension or hyperlipidemia, and a strong family history of diabetes. C-peptide levels can be useful in determining remaining beta cell function. The presence of circulating antibodies can identify patients who are likely to respond poorly to metformin and be at increased risk of ketoacidosis. There is questionable benefit to testing for autoimmune antibodies in patients with suspected type 2 diabetes, and research suggests that close glucose monitoring is equally as effective in determining when patients become insulin dependent. Although definitive treatment is insulin, glitazones may be useful in early stages of LADA. In contrast, metformin is thought to contribute to metabolic abnormalities in patients with autoimmune beta cell dysfunction.

TO BLEED OR TO CLOT? Lorelei Vandiver; Arti Thangudu; Chad S. Miller. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198508)

LEARNING OBJECTIVE #1: Learn how to manage procedures in patients who are Hemophilia B carriers.

LEARNING OBJECTIVE #2: Consider implications of a patient who is a carrier of Hemophilia B and a Factor V Leiden mutation.

CASE: A 46 year-old Caucasian woman with coronary artery disease who had a bare metal stent placement in 2008 to the left anterior descending artery (LAD) presented with pressure-like left-sided chest pain for four days. She was sent from an outside hospital given her history of hemophilia B and the likely need of cardiac catheterization. Past medical history was notable for being a hemophilia B carrier, having spontaneous hemarthrosis, and factor V Leiden mutation. Family history was significant for a father and son with hemophilia B and a daughter who was a carrier for hemophilia B. Her physical examination was noncontributory. A Lexiscan revealed a small area of myocardium in jeopardy in the right coronary artery territory and intermediate risk for obstructive coronary artery disease and major cardiac events. Factor IX activity was 46.0 %. Thirty minutes prior to the cardiac catheterization, the patient was given recombinant factor IX 25 u/kg. Right radial artery access was obtained for ease of compression. Coronary angiography revealed 50–60 % mid stenosis of the LAD; no stent was placed. The patient tolerated the procedure well and had no bleeding at the access site. Aspirin was held at discharge given her bleeding history.

DISCUSSION: This patient presented a unique dilemma given her need for cardiac catheterization and her genetic predisposition for both bleeding and clotting. Bleeding in hemophilia carriers has gained recognition in recent literature, especially during and after surgical procedures. One study emphasizing this increased risk demonstrated that 28 % of study participants with the carrier status had prolonged bleeding (>3 h) after an operation as compared to noncarriers (11 %). Conversely, heterozygous carriers of Factor V Leiden have been shown to have a 5 % risk of developing an unprovoked venous thromboembolus (VTE) by the age of 65. Our patient had no history of pulmonary embolus or deep vein thrombosis and she had no other risk factors that would increase her likelihood of developing a VTE, such as use of hormonal contraceptives, hormone replacement therapy or current pregnancy. Given the epidemiology of these disorders and their complications, as well as our patient's history of spontaneous hemarthrosis, we believed the patient was more likely to have a bleeding rather than clotting complication following catheterization. There are recommendations regarding percutaneous cardiac intervention (PCI) in patients with hemophilia. Correction of factor IX before and after the procedure is recommended and heparin may be used in hemophilia patients for anticoagulation. Although this patient was fortunate to not require a coronary artery stent, it is possible to administer dual antiplatelet therapy as long there is close supervision of factor levels. Hemophilia B and Factor V Leiden mutations can exist together and may bestow an evolutionary advantage over either one of these disorders when they are singularly present. The bleeding tendency in hemophilia may be modulated by the prothrombotic tendency in patients with Factor V Leiden. In the rare subset of patients with both hemophilia and factor V Leiden, care must be taken to balance the risk of bleeding with the risk of clotting, especially in cases where anticoagulation may be warranted.

TO CLOT OR NOT TO CLOT: LUPUS ANTICOAGULANT-HYPOPROTHROMBINEMIA SYNDROME TREATED WITH RITUXIMAB Sara Jane Cromer; Natalie Uy; Courtney N. Miller-Chism. Baylor College of Medicine, Houston, TX. (Tracking ID #2198330)

LEARNING OBJECTIVE #1: Recognize the classic presentation of lupus anticoagulant-hypoprothrombinemia syndrome (LAHS)

LEARNING OBJECTIVE #2: Treat LAHS with immunosuppressants such as rituximab in cases uncontrolled by factor replacement

CASE: A 57 year-old Hispanic male with history of alcohol abuse presented with gross hematuria preceded by flank pain and non-traumatic epistaxis for 3 days. He denied prior bleeding episodes, family history of hematologic or auto-immune disorders, and usage of antiplatelet or anticoagulant medications. On presentation, vital signs and physical exam were within normal limits, with the exception of mucosal bleeding and petechiae on the soft palate. Labs were remarkable for slight leukocytosis (12,100/ μ L), significant elevations in prothrombin time (PT, 33.6 s) and partial thromboplastin time (PTT, 130.6 s) with an INR of 3.6, and gross hematuria. Liver profile, D-dimer, and fibrinogen were normal. A mixing study showed normalization of PT but incomplete correction of PTT. After a precipitous drop in hemoglobin to 5.5 mg/dL (from 15.4 mg/dL on admission), up-trending INR to 4.5, and development of mild headaches, abdominal and head CT scans on hospital days (HD) 2 and 3 showed spontaneous and progressing retroperitoneal hemorrhage and interval development of two small subdural hematomas. He was admitted to the intensive care unit on HD 3 and started on 100 mg prednisone daily and vitamin K. Prothrombin complex concentrate, complex factor IX, and 36u of fresh frozen plasma (FFP) were administered over three days with limited and fleeting clinical and laboratory improvement. On HD 4, he was found to have Factor II activity at 17 % (normal 75–130 %), and a positive lupus anticoagulant (LA). Bleeding continued until HD 6, and the decision was made to start weekly rituximab at 375 mg/m². His hemoglobin and INR stabilized that day, and he received only two units of FFP during the remainder of his hospitalization. Repeat factor II activity on HD 8 improved to 60 %. He was discharged in

stable condition on HD 13 with plan for a prednisone taper and a total of 4 cycles of rituximab which were completed without complication as an outpatient. Coagulation studies remained stable 2 months after discharge.

DISCUSSION: While lupus anticoagulant (LA) is classically associated with venous and arterial thromboses, lupus anticoagulant-hypoprothrombinemia syndrome (LAHS) should be suspected when patients with positive LA present with a bleeding diathesis. In this syndrome, non-neutralizing anti-prothrombin antibodies lead to increased clearance of prothrombin and diagnostic studies suggesting both an inhibitor and a factor deficiency. LAHS can be associated with viral infections, autoimmune diseases (most commonly systemic lupus erythematosus), and hematologic malignancies. It is most commonly treated with factor replacement (FFP), vitamin K supplementation, and corticosteroids; however, there are no standardized recommendations for the treatment of this condition. Corticosteroids raise prothrombin levels by decreasing clearance of prothrombin-antibody complexes but do not prevent new antibody production. Other immunosuppressive treatments reported in the literature include azathioprine and cyclophosphamide in non-emergent cases, and IVIG or plasmapheresis in cases of acute hemorrhage. Recently, however, several case reports have suggested that rituximab may be a powerful tool in the suppression of acquired anti-prothrombin antibodies. In our case, rituximab infusion normalized the patient's INR and prevented the progression of developing retroperitoneal and subdural hemorrhages, supporting its clinical utility in the treatment of LAHS.

TO CONSIDER MAY- THURNER SYNDROME IN LEFT LOWER EXTREMITY DVT TO PREVENT FATAL THROMBOSIS shriyanka Jain; Apama Basu; Aasim Mohammed; David gevorgyan; krishna Devakiamma. Mercy Catholic Medical center, Philadelphia, PA. (Tracking ID #2198594)

LEARNING OBJECTIVE #1: Recognize May-Thurner as an important differential diagnosis in left lower extremity edema.

LEARNING OBJECTIVE #2: Recognize duration of anti-coagulation therapy in patient with may-thurner syndrome(MTS) and anti-phospholipid antibody.

CASE: Here we present a case of 37 y o Asian female who came with left lower extremity swelling and pain for past 3 days. Her past medical history is significant for lupus anti coagulant, 3 miscarriages and recent OCP use(2 weeks back). She denies any prior history of DVT. She works as an airline agent and has to stand for long periods of time. She denies Smoking or alcohol use. She has a brother who has history of DVT. On examination, the patient's vital signs were within normal limits. Her left lower extremity was warm, swollen, and erythematous from mid-calf to mid-thigh. Dorsalis pedis and posterior tibial pulses were normal, and reflexes, strength, and sensation were all normal. A complete blood count and basic metabolic profile were within normal limits. Her prothrombin time was 12.8 s, activated prothromboplastin time was 46.2 s, and international normalized ratio was 1.0. The patient had an elevated D-dimer at 5.34 ug/mL. Left lower extremity ultrasound showed Occlusive thrombus throughout the left lower extremity deep veins from common femoral to popliteal. CT abdomen and pelvis was done, with high suspicion for may-Thurner syndrome which showed DVT of left thigh extending to left external, internal and common iliac veins as well as 7.8 cm into infrarenal IVC. The Right common iliac artery was compressing on left common iliac vein. Patient immediately got placement of inferior vena cava filter to prevent Pulmonary embolism. A catheter was placed and thrombolysis was initiated with tissue plasminogen activator (tPA) at rate of 0.5 mg/hr. Heparin protocol for DVT was also started. Next day, she developed right neck hematoma, which was expanding, so the tPA and heparin were stopped. She was taken for Iliac vein stenting. Following placement of the left common and external iliac stent, venogram demonstrated no residual thrombus. She was restarted on heparin drip and bridged with Coumadin, without complications. She was discharged with 6 months of anticoagulation and outpatient heme/onc follow up to decide further treatment therapy.

DISCUSSION: May-Thurner syndrome is described as anatomical defect where right iliac artery compresses on left iliac vein. This anatomical defect increases the likelihood of clot formation in left lower extremity, as per Virchow's triad. May-Thurner syndrome causes 2-5 % of all symptomatic DVT's. Despite its prevalence, it is sometimes overlooked. One of the postulated reasons is that once we have other reasons to explain DVT, we pay less importance to anatomical variance. May-Thurner causes extensive thrombosis and if missed can lead to fatal pulmonary embolism and post-phlebitis syndrome. Therefore, May-Thurner should be included in differential diagnosis in patients with LEFT lower extremity swelling and edema. The diagnosis of May-Thurner syndrome is best made radiographically. The study of choice for May-Thurner syndrome is contrast venography, which shows compression of the iliac vein with spur or web formation. The treatment for MTS is not only limited to anti-coagulation, but also includes catheter-directed thrombolysis and stent placement. Our case is unique, as this patient has three predisposing factors for developing DVT including Anti-phospholipid antibody, recent OCP use and anatomic defect (may-Thurner syndrome). Therefore this case highlights that even patient has other predisposing factors, May Thurner should be ruled out as its treatment is entirely different and complications are fatal. The treatment as per ACCP

guidelines for duration of anticoagulation is not affected by the fact that the patient has may-Thurner, as she got stent placement that will prevent or eliminate the risk of stasis. The criteria to decide duration of treatment is dependent on the presence of antiphospholipid antibody and OCP use (provoked DVT) in this case. However, there are some case-reports suggesting the risk of developing in-stent thrombosis. Hence, regular follow-up is required to identify high-risk patients and further evaluate the treatment therapy that might include- re-stenting, repeat thrombolysis or life long anticoagulation.

TOO FEW MICE Robert Mocharla³; Synphen Wu³; Joshua Denson³; Douglas Bails¹; Richard E. Greene². ¹Bellevue Hospital Center, New York, NY; ²NYU School of Medicine, New York, NY; ³NYU School of Medicine, New York City, NY. (Tracking ID #2196451)

LEARNING OBJECTIVE #1: Re-assess a working diagnosis when there is deviation from the predicted clinical course.

LEARNING OBJECTIVE #2: Recognize and take into account geographic and epidemiologic factors when generating a differential diagnosis.

CASE: A 49-year-old man with no medical history presented with 4 days of fevers and headaches. Two days before presentation, he noticed a painless white papule on his left wrist that grew in size. He denied any recent skin breaks or trauma to the wrist. He also denied gardening, travel, or sick contacts. He lived in an apartment in a major urban city. On admission, he was febrile to 101.9 F with a heart rate of 109 beats per minute. He had a 3x3cm clear vesicle with a white center on his left wrist. Laboratory data revealed a white blood cell count of 5.1, C-Reactive Protein of 37, and a normal Erythrocyte Sedimentation Rate. Radiographic examination revealed mild soft tissue swelling over the ulnar styloid. On initial impression, diagnosis of a superficial infection was made (folliculitis). He was started on oral cephalexin. The following day, he became febrile to 102.6 F with a severe headache. Vancomycin was started out of concern for Methicillin-resistant *Staphylococcus aureus*. His fevers and headaches continued despite treatment. On hospital day four, his wrist lesion darkened into an eschar, and non-grouped papules developed on his arms and back. At this point, the team questioned the patient's working diagnosis and returned to the patient for further questioning. This revealed the patient had frequently spotted mice in his apartment for several months. With this information, the team suspected Rickettsialpox based on the constellation of symptoms, rodent contact, and exam findings. He was started on doxycycline and his symptoms resolved within 3 days. Initial serologic testing for Spotted Fever Group of Rickettsial agents (SFG) returned negative, but converted to positive on a sample taken 2 days after discharge.

DISCUSSION: Rickettsialpox is a rare zoonotic disease caused by the intracellular bacteria *Rickettsia akari*. The common house mouse (*Mus musculus*) serves as its natural reservoir, and it is transmitted to humans via a bite from an infected mite (*Liponyssoides sanguineus*). Infected mites don't routinely feed on humans, but may do so when unable to find mice. The disease is primarily found in urban settings, and the first case was described in New York City in 1946.¹ There have been roughly 800 documented cases since the first description, though this is believed to be a gross underestimate of worldwide cases. The disease has been associated with homelessness and intravenous drug abuse.² Outbreaks have occurred following rodent extermination campaigns, presumably as infected mites turn to humans after losing their natural hosts. After inoculation, the incubation period can range from 10 to 14 days. The first clinical manifestation is the formation of a painless vesicle at the site of inoculation. Over the next several days, the vesicle evolves into the classic, painless eschar. At this time, patients experience systemic symptoms such as fever, malaise, sweats, and headaches. This is followed by eruption of papulovesicular lesions involving the extremities and trunk, but rarely the palms and soles. Common laboratory tests can reveal a leukopenia with lymphocyte predominance, and more recent reports have shown mild hepatitis.³ The natural course of the disease is self-limited within 2-3 weeks, hospitalization is rare, and there are no reported fatalities. Doxycycline is the standard treatment, and should be continued until patients are asymptomatic for 48-72 h. Definitive diagnosis is made by serologic antibody testing (SFG testing includes *R. akari*), though patients may not seroconvert for 1-2 weeks. Diagnosis is also made by PCR testing of a biopsied lesion, however this test is not widely available.^{4,5} Although rickettsial diseases are generally associated with rural areas and outdoor travel, rickettsialpox is primarily found in major cities. Patients presenting in urban areas with the classic eschar should be questioned on possible rodent exposure, and particularly if there has been any recent rodent extermination. Treatment should be started if there is strong clinical suspicion. Most importantly, a working diagnosis should be promptly re-examined whenever there is deviation from the normal clinical course. 1. Public Health Weekly Reports for November 8, 1946. Public Health Rep 1946; 61:1605. 2. Brouqui P, Raoult D. Arthropod-borne diseases in homeless. Ann NY Acad Sci 2006; 1078:223-225. 3. Madison G, Kim-Schlager L, et al. Hepatitis in association with rickettsialpox. Vector Borne Zoonotic Dis 2008; 8:111. 4. Kass EM, Szaniawski WK, et al. Rickettsialpox in a New York City hospital, 1980-1989. N Engl J Med 1994; 331:1612. 5. Paddock CD,

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TOUGH TO SWALLOW: A RARE CASE OF DYSPHAGIA DUE TO THORACIC AORTIC ANEURYSM Ani A. Kardashian², Yile Ding¹. ¹UCSF, San Francisco, CA; ²University of California, San Francisco, San Francisco, CA. (Tracking ID #2193846)

LEARNING OBJECTIVE #1: Differentiate pseudoachalasia from true achalasia

LEARNING OBJECTIVE #2: Recognize aortic aneurysm as a rare but potentially fatal cause of dysphagia

CASE: An 81 year-old woman with a 3-year history of progressive dysphagia to both solids and liquids presented with sudden worsening of dysphagia and odynophagia during a meal. The patient reported “pressure” in her throat that extended down her esophagus, emesis, and regurgitation of food and saliva. Review of systems revealed a 5-pound weight loss over 1 month and occasional acid taste in her mouth. Past medical history included hypertension, hyperlipidemia, ischemic stroke with residual left leg weakness, and bilateral kidney transplant 5 years prior due to microscopic polyangiitis. Medications included prednisone, tacrolimus, amlodipine, metoprolol, pravastatin, aspirin, famotidine, calcium, and vitamin D. The patient had normal vital signs, normal cardiopulmonary exam, and a soft, nontender abdomen without palpable masses. Distal pulses were intact. Neurologic exam revealed left leg weakness consistent with her prior stroke. X-ray esophogram showed a dilated, tortuous, aynamic esophagus with residual food material and contrast. There was no evidence of mass, focal stricture, or narrowing of the gastroesophageal junction. Modified barium swallow study showed oropharyngeal dysphagia with reflux into the trachea. Upper endoscopy revealed a normal esophagus, gastroesophageal junction, and stomach without anatomic explanation for her dysphagia. She was given the presumptive diagnosis of atypical achalasia and empirically treated with botulinum injections at the site of the lower esophageal sphincter with improvement in her dysphagia. She was discharged with a nasogastric feeding tube, and plan for outpatient esophageal manometry with possible percutaneous endoscopic gastrostomy tube placement. The patient returned 12 days later with left-sided chest pain. An electrocardiogram demonstrated normal sinus rhythm without ischemic changes. Chest radiograph revealed tortuosity and ectasia of the thoracic aorta and left basilar atelectasis. Computed tomography of the chest revealed a dilated aorta measuring 8.0 by 6.6 cm with irregular contour at the diaphragmatic hiatus compressing the distal esophagus and causing leftward deviation of the stomach. The diagnosis of dysphagia aortica was made. The patient declined surgical correction of the aneurysm. Percutaneous endoscopic gastrostomy tube was not pursued due to concern for precipitating aneurysmal rupture and she was discharged home with a nasogastric feeding tube.

DISCUSSION: This case demonstrates the difficulty and importance of differentiating pseudoachalasia from true achalasia. While the classic description of “gradual progressive dysphagia of both solids and liquids” triggers the thought of achalasia, clinicians must remain vigilant in searching for conditions that cause pseudoachalasia in older patients, namely a gastroesophageal junction tumor and, more rarely, dysphagia aortica. True achalasia is a benign esophageal motility disorder characterized by failure of lower esophageal relaxation with swallowing and “bird’s beak” appearance on esophagram. This patient has a classic case of dysphagia aortica, a rare condition of low sternal dysphagia from external esophageal compression by an ectatic, tortuous, or aneurysmal aorta. Dysphagia aortica is classically seen in elderly women with a history of hypertension, atherosclerotic aortic changes, and kyphosis. The diagnosis is often difficult to make due to coexisting conditions such as gastroesophageal reflux disease or motility disorders. Barium esophagram, esophageal manometry, and endoscopy may show extrinsic compression of the esophagus. However, findings are subjective and inconsistent, and radiographic and/or endoscopic findings can be minimal or absent. In an elderly patient, findings suggestive of significant atherosclerotic disease and features inconsistent with classic achalasia should push clinicians to search for dysphagia aortica with computed tomographic angiography or aortography. Timely diagnosis of dysphagia aortica has therapeutic implications. The aneurysm should be surgically corrected and the aorta should be separated from the esophagus, as mortality rates from aneurysmal rupture are high. In summary, dysphagia aortica is a rare type of pseudoachalasia seen in the elderly that should not be overlooked, as it is a fatal yet treatable condition.

TOXIC SHOCK SYNDROME FOLLOWING INFLUENZA B INFECTION Suzuki Hirofumi; Ayako Kumabe; Yuka Sagara; Yoshiaki Nishimura; Tsuneaki Kenzaka; Masami Matsumura. Jichi Medical University Hospital, Tochigi, Japan. (Tracking ID #2195548)

LEARNING OBJECTIVE #1: Recognize toxic shock syndrome as complication of influenza.

LEARNING OBJECTIVE #2: Diagnose fever, hypotension, skin rash, and multi-organ involvements post influenza.

CASE: A 59-year-old Japanese man presented with a 10-day history of fever and a 3-day history of hypotension. Ten days prior to admission to our hospital, he visited a nearby hospital with fever of 39 °C. He was diagnosed as influenza B by rapid influenza diagnostic test and was given oseltamivir, but fever of over 38 °C persisted. Four days before admission to our hospital, he was admitted to nearby hospital and was given intravenous ceftriaxone. However, fever continued and his blood pressure decreased to 80 mmHg. He was transferred to our hospital for close examination and treatment. He had had a 1-year history of hypertension and a 5-year history of sinusitis. He was receiving 5 mg per day of amlodipine and 200 mg per day of clarithromycin. On examination, his temperature was 37.7 °C, blood pressure was 132/80 mmHg, and pulse rate was 96/min. Conjunctivae were hyperemic and icteric. Erythematous macular rash was noted over the chest and back. Laboratory findings included a leukocyte count 6600/μL, hemoglobin 10.6 g/dL, platelet count 40,000/μL, total bilirubin 4.9 mg/dL, direct bilirubin 4.0 mg/dL, aspartate aminotransferase 27 IU/L, alanine aminotransferase 23 IU/L, creatinine kinase 17 IU/L, urea nitrogen 28 mg/dL, and creatinine 1.3 mg/dL. The blood cultures were sterile. Abdominal computed tomography disclosed no abnormalities in liver, gallbladder, and bile duct. Although no tick bite mark or eschar was noted, we firstly suspected rickettsial infection based on hyperemia, skin rash, and liver dysfunction. He was started on 200 mg per day of intravenous minocycline for 3 days without improvement. Secondly, we suspected drug fever and all medication was ceased, however, symptoms did not improve again. On hospital day 5, total-bilirubin increased to 14.1 mg/dL and platelet count decreased to 35,000/μL. Post influenza toxic shock syndrome (TSS) due to *Staphylococcus aureus* was considered from the history, especially episode of hypotension in nearby hospital, physical examination, and data. He started on 12 g per day ampicillin-sulbactam. On hospital day 6, culture of sputum yielded methicillin-resistant *Staphylococcus aureus* that was thought of as colonized organism in respiratory tract. This strain was producing enterotoxin D. We added 2 g per day of vancomycin. On hospital day 13, fever and erythematous macular rash ameliorated. Platelet count increased to 370,000/μL and total-bilirubin decreased to 3.9 mg/dL. On hospital day 19, desquamation of both fingers were observed. TSS complicating influenza B was diagnosed. He made a full recovery.

DISCUSSION: TSS can occur as complication of influenza infection in rare cases. Non-pulmonary complications of influenza include myositis, myocarditis, pericarditis, central nervous system complications, Reye’s syndrome, and TSS. In these complications, cutaneous symptom can only be noted in TSS. Changing colonization and replication characteristics of the toxin-producing staphylococcus in respiratory tract by influenza infection is thought as the cause of TSS. Physicians should consider TSS as complication of influenza when persisted fever, hypotension, skin rash followed by desquamation, and multi-organ involvements observed in patients with post influenza infection.

TREATMENT OF BING-NEEL SYNDROME Ronen Harel; Diana Lee; Dana Shani. Lenox Hill Hospital, New York, NY. (Tracking ID #2192430)

LEARNING OBJECTIVE #1: To recognize subtle signs and symptoms of Bing-Neel Syndrome

LEARNING OBJECTIVE #2: Diagnose and treat Bing-Neel Syndrome

CASE: A 65 year old Caucasian female with a past medical history of hypertension, Non Hodgkins Lymphoma treated with R-CHOP 10 years prior and a recent diagnosis of Waldenstrom’s Macroglobulinemia presented with 6 h history of expressive aphasia. The symptoms started suddenly and were not associated with any other focal neurological deficits. In the weeks prior to presentation she had increased lethargy, headaches, malaise and worsening exercise tolerance. Upon arrival to the emergency department the patient had CT & MRI of her head/neck, both of which showed no evidence of CVA, however demonstrated on the Flair/T2 weighted images scattered punctuate foci of increased signal within the periventricular and subcortical white matter. Serum viscosity level was checked which was in the normal range. Further workup was conducted including a lumbar puncture. CSF examination illustrated IgM level >6 mg/dl (normal <.1), cytology and flow cytometry showed a monoclonal kappa, CD10 positive B-Cell population was present consistent with CNS involvement. The patient was started on systemic chemotherapy with Rituximab 375 mg/m² and Bendamustine 90 mg/m² every 4 weeks as well as intrathecal Methotrexate 15 mg twice weekly for 3 months. At that time patient had a repeat MRI of the brain showing marked diminution in pathologic enhancement and signal abnormalities, repeat cytology and flow cytometry no longer identified a monoclonal B-Cell population of cells and CSF IgM levels have decreased to 2.94 mg/dl. Clinically, the patient had improved markedly and no longer had any focal neurological deficits.

DISCUSSION: Waldenstrom’s Macroglobulinemia is a lymphoplasmacytic lymphoma characterized by a clonal production of dysfunctional plasma cell that produces an excess amount of IgM immunoglobulins. When this disease involves the central nervous system,

it is referred to as Bing-Neel syndrome. The incidence of this disease is very rare and because of this, there are no guidelines or standard of treatment. This case demonstrates a case of Bing-Neel treated with Bendamustine, Rituximab and intrathecal Methotrexate with a positive initial response to treatment.

TWISTED CYSTER Julie Steinbrink; David Macari; Gail Larsen; Paul J. Grant. University of Michigan, Ann Arbor, MI. (Tracking ID #2180170)

LEARNING OBJECTIVE #1: Recognize the clinical manifestations of neurocysticercosis in a patient with the appropriate exposure history.

LEARNING OBJECTIVE #2: Learn how to diagnose and treat a patient with neurocysticercosis.

CASE: A 21 year old Spanish-speaking male immigrant from Guatemala with no significant past medical history presented to the emergency department with nausea, vomiting, neck pain, and vertigo. He was noted to have bilateral horizontal nystagmus on exam. A CT scan of the head was normal, and lumbar puncture with cerebrospinal fluid (CSF) analysis demonstrated lymphocytic predominance, elevated protein, and low glucose. He was admitted to the hospital and started empirically on broad-spectrum antibiotics, dexamethasone, and antiviral coverage for meningitis. CSF cultures showed no growth, and the patient clinically improved. He was diagnosed with aseptic meningitis and discharged home without antibiotics. However, he later presented four more times to the emergency department with recurrent symptoms of nausea, dizziness, and back pain. When his presentation included new-onset ataxia, he was again admitted to the hospital. A repeat lumbar puncture demonstrated an increased opening pressure. MRI showed an enhancing fourth ventricle mass and mild obstructive hydrocephalus, along with a mass at the L2/L3 spine. He underwent ventriculostomy placement, but was found to have normal intracranial pressures. The spinal lesion was biopsied, and demonstrated reactive macrophages. CSF analysis returned positive for cysticercosis antibody by ELISA, and was confirmed by serum cysticercosis IgG/Western Blot. The patient remained stable and due to financial difficulties with albendazole treatment, it was decided to monitor the patient with outpatient follow-up.

DISCUSSION: Cysticercosis is a parasitic infection transmitted by ingestion of *Taenia solium* (pork tapeworm) eggs. It is prevalent in Central and South America, and in endemic regions is one of the most common helminthic infections of the central nervous system. It can be challenging to diagnose, as clinical symptoms are nonspecific and can vary significantly between individuals. Parenchymal involvement of neurocysticercosis commonly presents with seizures. In extraparenchymal disease, hydrocephalus can develop if the cysts are trapped in the interventricular foramina. Diagnostic criteria for neurocysticercosis includes neuroimaging, serology, CSF analysis, and biopsy in the appropriate population. After diagnosis, the patient should be started on antiparasitic therapy, most commonly a combination of albendazole and corticosteroids. Patients that present with seizures may also require antiepileptic therapy. The prevalence of cysticercosis is increasing in the US with the rising number of immigrants from endemic areas. Neural involvement can be the presenting manifestation with a wide range of signs and symptoms, including seizures, nausea, vomiting, ataxia, and hydrocephalus. It is important to consider this diagnosis in patients with nonspecific neurologic complaints and the appropriate exposure history.

TWO CASES OF HERPES ZOSTER NEUROLOGICAL COMPLICATIONS

Daiki Morikawa; Eiji Hiraoka. Tokyo bay Urayasu Ichikawa Medical Center, Urayasu, Japan. (Tracking ID #2194408)

LEARNING OBJECTIVE #1: Recognize the features of herpes zoster neurological complications

LEARNING OBJECTIVE #2: Recognize the importance of early treatment of herpes zoster neurological complications

CASE: **Case1:** A 84 year-old Japanese male with significant past medical history of hypertension and benign prostatic hyperplasia presented with 5-day history of back pain and 2-day history of rash on left buttock which spread to his left thigh. His vital signs were stable except for temperature of 37.5 °C. He had red papular rash with vesicle and crust from left buttock to left anterior thigh. Due to the distribution of L1 and L2 dermatome, disseminated herpes zoster was diagnosed and acyclovir was started. Three days after admission, he developed muscle weakness of left lower extremities. Left knee reflex was hyperactive. Babinski signs were positive bilaterally. The sensation to touch and pin prick was disturbed mildly in the left L1 and L2 dermatome. Atonic bladder was found as well. MRI of the head was within normal limit. Herpes zoster myelitis was diagnosed clinically. Three days later, methylprednisolone 60 mg/day was started with continuation of acyclovir. His neurological symptoms gradually subsided and became able to walk in 19 days. He was transferred to another hospital for further rehabilitation. **Case2:** A 73 year-old Japanese male with end stage renal disease on maintenance hemodialysis secondary to

diabetes mellitus type II was admitted for the treatment of cellulitis associated with the infection of arteriovenous synthetic graft in the left arm. His vital signs showed temperature of 38.5 °C, blood pressure of 147/68 mmHg, heart rate of 92 beats/min, respiratory rate of 31 breaths/min, and oxygen saturation of 94 % on 2 l of oxygen. He was treated with antibiotics and removal of the graft. Two days after admission, he became afebrile. The blood culture grew up *Staphylococcus aureus*. Five day after admission, he developed painful red papular rash with vesicles and blisters on left upper extremity. He was diagnosed with herpes zoster clinically. Valaciclovir had been prescribed. 12 days after onset of rash, he had significant muscle weakness at left arm. The sensation was disturbed mildly in left C5 to Th1 area. Deep Tendon Reflex was hypoactive at left upper extremity. There was no neurological abnormality on both lower extremities. Negative Babinski sign was noted. He did not have bladder or rectal problems. The head MRI was within normal limit. Peripheral neuropathy was diagnosed. Five days after onset of the neuropathy, methylprednisolone 60 mg/day was initiated with re-prescription of valaciclovir. On the following days paralysis was a little resolved. He was discharged with paralysis remained. Finally, 5 months later, paralysis subsided.

DISCUSSION: We experienced two cases of herpes zoster neurological complications, helps zoster myelitis and peripheral neuropathy. The neurological complications of herpes zoster include meningitis, encephalitis, myelitis, peripheral neuropathy, postherpetic neuralgia, and vasculopathy. Myelitis is rare complications. The frequency of myelitis during or after herpes zoster is 0.3 %. Muscle weakness caused by herpes zoster peripheral neuropathy was also uncommon. Chih-Hsien Hung et al. reported 17 patients (54.8 %) of herpes zoster myelitis were immunocompromised. In our cases, their immunocompromised state as hemodialysis, diabetes mellitus, old age and severe infection, was considered to be related with their rare neurological complications. It has been suggested that not only direct viral invasion but also host immune response contribute to the pathology of neurological complication. Therefore, it is important to treat with acyclovir to prevent multiplication and spread of the virus in the nervous system as well as with prednisolone to prevent the damage of neuron by overwhelming immune reaction. Furthermore, the early initiation of the treatment is a key to the better neurological outcome. Cheng-Chia Lee et al. reported that in immunocompetent patients, the longer the interval between onset of myelopathy and administration of acyclovir/corticosteroids, the slower the observed improvement, and the longer the recovery time. In our first case, the steroid was initiated 3 days after the onset of muscle weakness. In second case, the steroid was started 5 days after the onset of neurological abnormality. First case patient recovered 19 days after the treatment and second case patient had recovered gradually for 5 months. We believe that early medical intervention is necessary to improve functional outcome. Conclusion: We reported two cases of herpes zoster complicated with myelitis and peripheral neuropathy. Early treatment with acyclovir and prednisolone is important for the neurological outcome. For the early diagnosis, physicians should be careful of neurological symptoms and signs especially among herpes zoster patients with old age, DM, and end stage renal disease as our cases.

UNDERCOVER PSORIATIC ARTHRITIS Steven Beckoff; Alexander Diaz de Villalvilla. Montefiore Medical Center, New York, NY. (Tracking ID #2200164)

LEARNING OBJECTIVE #1: Recognize diagnostic criteria for psoriatic arthritis in absence of psoriasis.

LEARNING OBJECTIVE #2: Understand the extra-articular manifestations of psoriatic arthritis

CASE: Forty-seven year-old woman from Congo with hypothyroidism presented to clinic with generalized fatigue. She noted that since moving to the US 10 years ago, her hands were slowly changing. Her fingernails had become abnormal and she was covering up these with synthetic press-on nails. She also noticed the distal hand joints were becoming more lax and had difficulty grasping objects with them. She had no loss of sensation and also no consistent pattern of pain, warmth, or redness in these joints. No family history of arthropathy or autoimmune conditions. Her vital signs were normal, and exam was significant for swelling of the distal phalanges, with increased distal interphalangeal joint laxity and telescoping of these joints. Of the non-artificial nails, there was pronounced onycholysis with nail plate dystrophy. Full range of motion and without synovitis in all other joints. No abnormalities of the feet. Normal intact skin. Laboratory data revealed a CRP 0.5 mg/dL, ESR 34 mm/h, ANA negative, RF negative, Anti-CCP negative. Bilateral hand radiographs showed prominent erosive changes at scattered distal phalanges of both hands, worse on the right than the left, compatible with acroosteolysis. Smaller erosive changes are noted at the base of the left first proximal phalanx, left fifth metacarpal head, base of the right fifth metacarpal and bases of the right second and fifth proximal phalanges. Joint space narrowing at the left fifth distal interphalangeal joint with periarticular osteophytes. With these skeletal, nail, and serologic markers, patient was diagnosed with psoriatic arthritis.

DISCUSSION: The diagnosis of psoriatic arthritis in a patient without overt psoriasis can be challenging. A recent study revealed that the CASPAR (CIASSification criteria for

Psoriatic Arthritis) is both sensitive and specific for diagnosis. A patient needs 3 points from the following: Current psoriasis (2 points); history of psoriasis (1); family history of psoriasis (1); dactylitis (1); juxtaarticular new bone formation (1); Rheumatoid factor negativity (1); Nail dystrophy (1). If meeting these >3 points, these criteria were 98.7 % specific and 91.4 % sensitive for psoriatic arthritis. By While it is often the internist who raises clinical suspicion for the diagnosis of psoriatic arthritis, this disease necessitates collaboration with specialists for its long-term manifestations. For example, ocular involvement occurs in 30 % of patients, most commonly conjunctivitis and acute anterior uveitis; thus ophthalmologic referral is recommended. Patients with psoriatic arthritis are at higher risk of developing other autoimmune conditions, including inflammatory bowel disease and Multiple Sclerosis. Also, not uncommonly, the appearance of psoriatic plaques appears years after the initial joint manifestations, for which dermatology consultation is recommended. The patient was referred to dermatology, rheumatology, and ophthalmology. Because of her relative lack of symptoms, she is on a current regimen of ibuprofen as needed, which is about once weekly.

UNILATERAL PTOSIS AND EYE SWELLING AS INITIAL MANIFESTATIONS OF ACUTE MYELOID LEUKEMIA Anjani Pillarisetty¹; Puja Choksi¹; Allan Cruz²; Joseph Catlett². ¹Medstar Washington Hospital Center, Silver Spring, MD; ²Medstar Washington Hospital Center, Washington, DC. (Tracking ID #2199305)

LEARNING OBJECTIVE #1: Recognize atypical presentations of acute myeloid leukemia

LEARNING OBJECTIVE #2: Diagnosing acute myeloid leukemia in a patient with new eye swelling

CASE: A 27 year old female from El-Salvador with no significant past medical history initially presented with complaints of swelling and pain in her right eye associated with ptosis, blurring of vision and a diffuse headache. An MRI of the brain and orbits revealed an extensive tumor involving the right orbit, cavernous sinus, maxillary sinus, ethmoid sinus, pterygopalatine fissure, infratemporal fossa and nasopharynx. Systemic examination was otherwise unremarkable. The mass was biopsied by Ophthalmology and she was found to have extramedullary acute myeloid leukemia, also known as orbital myeloid sarcoma. The tumor was positive for myeloperoxidase, CD34, CD43, CD99, BCL-2 and TdT, and negative for CD3, CD4, CD5, CD8, CD10, CD20, CD79a, PAX5, CD23, CD138, CD30 and S100. A complete blood count was obtained and normal. Bone marrow biopsy and lumbar puncture were negative for leukemic cells. She was started on induction chemotherapy with cytarabine and idarubicin with a repeat CT scan on day 14 showing significant regression of the leukemic infiltrate.

DISCUSSION: Acute myeloid leukemia can present in various extramedullary tissues as a solid tumor composed of immature myeloid cells. It was first described by Burns in 1811 and was later named "chloroma" by King in view of its green tint due to the presence of myeloperoxidase. It may also be referred to as granulocytic sarcoma or myeloid sarcoma. Myeloid sarcoma is reported in 2.5 to 9.1 % of patients with acute myeloid leukemia, and most commonly involves bone, soft tissues, lymph nodes, skin and kidneys. Although orbital myeloid sarcoma typically affects children and young adults, it can present at any age between infancy to 61 years, as is the case with our patient. These tumors may occur concomitantly, as a relapse or precede systemic leukemia. A large study by Zimmerman and Font demonstrated 88 % of orbital myeloid sarcomas to precede onset of systemic leukemia, and in the absence of treatment, the median time to development of systemic acute myeloid leukemia is generally 5 to 12 months. Orbital myeloid sarcomas can exhibit various clinical features such as orbital swelling, ptosis and periorbital cellulitis in the setting of an otherwise normal systemic examination and normal blood counts; however, proptosis has been described to be the most common presenting sign. These tumors are most often mistaken for non-Hodgkin lymphoma, but other differential diagnoses include rhabdomyosarcoma, neuroblastoma and melanoma. A CT scan and MRI are often not sufficient to differentiate myeloid sarcomas from these other tumors. A tissue biopsy is required to confirm diagnosis, along with immunohistochemistry, flow cytometry, fluorescence in situ hybridization, and molecular analysis. Once diagnosis is established, a bone marrow biopsy and lumbar puncture should also be performed in order to determine the presence of any systemic involvement. This clinical case emphasizes just how vital it is for a clinician to recognize the possibility of myeloid sarcoma in a patient presenting with orbital swelling, ptosis or proptosis, so that he or she is able to treat the patient adequately and perhaps prevent development of systemic acute myeloid leukemia.

UNIVERSAL VITILIGO, HEMOLYTIC-UREMIC SYNDROME, AND A GASTRIC MASS: AN UNUSUAL PRESENTATION OF HIV-2 Francis E. Dailey²; Bianca Chang²; Helen Huang²; Teo Soleymani¹; Ali Rezaie¹; Kapil Gupta¹; Robert I. Goodman². ¹Cedars Sinai Medical Center, Glendale, CA; ²Cedars-Sinai Medical Center, Los Angeles, CA. (Tracking ID #2198355)

LEARNING OBJECTIVE #1: Recognize HIV-2 in those from West Africa.

LEARNING OBJECTIVE #2: Diagnose patients with signs of HIV/AIDS despite a negative rapid HIV test.

CASE: HIV has been associated with renal disorders including hemolytic-uremic syndrome (HUS), dermatologic conditions such as vitiligo, and malignancies like Kaposi's sarcoma (KS). These conditions typically manifest late in the course of the disease and are infrequently the initial manifestation of infection. Here we describe a heterosexual Nigerian gentleman, diagnosed with both HUS and vitiligo in the past year, who presented for work-up of a gastric mass. Approximately 5 months prior, at an outside institution, he had received two separate esophagogastroduodenoscopies (EGDs) with over twenty biopsies of a gastric mass, presumed to be adenocarcinoma. All biopsies were inconclusive; thus, he never received treatment. On presentation to our medical center, he complained of severe abdominal pain, nausea, and vomiting. EGD revealed a large, ulcerating gastric mass, with biopsies demonstrating KS. Rapid HIV test performed at his follow-up appointment was negative. One week later, he returned to the hospital, this time with hematemesis. Upon admission, patient was started on a pantoprazole infusion and gastroenterology was consulted. HIV antibody testing was rapidly reactive and negative for HIV-1, but positive for HIV-2. The next morning, he had two more episodes of hematemesis, then melena and hematochezia associated with orthostatic hypotension. He was transferred to the intensive care unit (ICU) for closer monitoring and received, over 24 h, 6 units packed red blood cells, 1 unit plasma, and 1 unit platelets. He was also started on octreotide infusion as an adjunctive therapy for gastrointestinal bleeding (GIB). Bedside EGD revealed bright red blood and a large clot in the stomach that could not be suctioned nor bypassed with the endoscope. The procedure was subsequently aborted and interventional radiology consulted for embolization of the feeding vessel. After embolization of the left gastric artery, patient underwent radiation to his stomach and started doxorubicin chemotherapy with plans to initiate highly active antiretroviral therapy (HAART) upon completion. Day 8 post-GIB, he is medically stable and tolerating chemotherapy and HAART well.

DISCUSSION: This case illustrates the importance of a higher index of suspicion for HIV-2 in patients who have immigrated from or spent significant time in West Africa, as well as those with signs of HIV/AIDS despite a negative rapid HIV test. Although rare in the U.S., with only 166 cases reported to the CDC between 1987 and 2000, HIV-2 is endemic to West Africa. It is suspected that reported cases in the U.S. are an underestimate, given the large number of immigrants from HIV-2 endemic areas, and that most patients are asymptomatic. The ultimate treatment of HIV-2 remains the same as HIV-1- initiation of HAART for reconstitution of CD4+ T cells. Moreover, this case underlines the importance of a collaborative multidisciplinary approach among internists, gastroenterologists, interventional radiologists and oncologists in the management of GIB secondary to KS.

UNUSUAL CAUSE OF GASTRIC OUTLET OBSTRUCTION Meredith M. Barr; Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198478)

LEARNING OBJECTIVE #1: Recognize typical and atypical causes of gastric outlet obstruction

LEARNING OBJECTIVE #2: Discuss a rare form of lymphoma with variable presentation and approach to diagnosis

CASE: A 59-year old African American man with no significant medical history presented with a 1-month history of nausea, vomiting, and poor oral intake. He also complained of increasing abdominal girth. He reported non-bloody emesis after every meal consisting of undigested food. On physical exam he had a palpable mass in the right upper quadrant. Initial laboratory diagnoses showed severe electrolyte derangements including a sodium of 124, potassium of 2.7, chloride of 76, and creatinine of 1.8. His laboratory evaluation also showed an acute transaminase elevation with total bilirubin 4.0, AST 174, ALT 251, Alkaline Phosphatase of 341 and lipase elevation to 2670 (laboratory reference range 1-400). Computed tomography revealed a soft tissue conglomerate in the gastric outlet concerning for neoplasm. Subsequent esophagogastroduodenoscopy revealed a large friable circumferential lesion in the duodenum. Multiple biopsies were consistent with intravascular large B cell lymphoma. Oncology was consulted and recommended evaluation for staging of lymphoma. He received one round of methotrexate, rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone with plans for 8 more rounds of chemotherapy. Elevation of transaminases and lipase were due to obstruction of the common bile duct by duodenal mass; therefore, an external biliary drain was placed. After multiple complications during his stay, he was discharged with plans for continued R-CHOP Therapy as an outpatient.

DISCUSSION: This patient presented with signs and symptoms of gastric outlet obstruction. Gastric outlet obstruction is due to a pyloric stricture and can be related to numerous medical conditions. Prior to 1970, the most common etiology of gastric outlet obstruction was related to peptic ulcer disease. However, these cases have declined with development of proton pump inhibitors and recognition and treatment of *Helicobacter pylori*. Malignancies now cause a large portion of these lesions with peri-pancreatic malignancies

reported in 10–20 % of cases. Other malignant causes may include gastric cancer, cholangiocarcinoma, and primary duodenal cancer. Other benign causes included in a differential for gastric outlet obstruction include corrosive ingestion, gallstone obstruction, chronic pancreatitis, sarcoidosis, and infective causes including tuberculosis and syphilis continue to be possible. Early signs include early satiety, gastric fullness, indigestion, anorexia and emesis containing undigested food within hours after meals. Laboratory findings may be non-specific reflecting hyperemesis with hypokalemia, hypochloremia, and signs of dehydration. While diagnosis is often made through imaging, Endoscopy is preferred for evaluation of gastric outlet obstruction. Biopsies taken on endoscopy may prove to be diagnostic, as in the case of the patient above. Intravascular large B cell lymphoma is a rare non-Hodgkins type lymphoma estimated to occur in less than one in one million cases. It is defined as an extra-nodal lymphoma in the endothelium with a preference for capillaries, sparing larger vessels. The most common presentation is central nervous system involvement, occurring in two thirds of cases; however case reports have suggested that presentations with skin involvement and individual organ involvement are also possible. Intravascular B cell lymphoma rarely presents with peripheral blood involvement in only 5–9 % of all diagnosed patients. The diagnosis of intravascular B cell lymphoma is made by histopathology of primary lesion. Patients often have a poor prognosis related to delay of diagnosis given highly variable presentation and rapid progression.

VENOUS THROMBOSIS ON RIVAROXABAN? Manisha Bhide. University of Colorado Denver, Aurora, CO. (Tracking ID #2195907)

LEARNING OBJECTIVE #1: Review newer oral anticoagulants in management of DVT and compare and contrast with older anticoagulants.

CASE: Fifty-five year male presented to his primary care physician for acute left leg swelling, calf pain and prominent painful veins with increasing redness. He had past medical history of 2 episodes of recurrent deep vein thrombosis (DVT) and Heterozygous Factor V Leiden mutation. He had been on chronic anticoagulation for past 10 years. He has family history of DVT and Factor V Leiden mutation in his father. He also had superficial saphenous vein thrombosis and mild lower extremity edema which is well controlled with compression stockings. He has been compliant with INR monitoring for many years. He heard about the newer anticoagulants in media and was keen to take them. He had a detail discussion regarding anticoagulants and decided to take rivaroxaban for chronic anticoagulation for DVT prophylaxis. He took rivaroxaban for 14 months and was doing well, until 2 days ago when he noticed increasing left leg pain and swelling. On exam, his vitals were normal. He had bilateral superficial prominent lower extremity veins and 1+ edema in left leg. Urgent ultrasound of left leg was done. The posterior tibial vein failed to compress, demonstrating filling defect. Greater saphenous vein failed to compress and demonstrated filling defect to the level of the ankle. The lesser saphenous vein contains a septation and partial filling on color Doppler. Thus a ultrasound diagnosis of new acute superficial venous thrombus in the greater and lesser saphenous veins in setting of chronic DVT was reached. Pt denied travel or prolonged immobilization. This thrombosis was concerning since he developed it while on rivaroxaban. Rivaroxaban was stopped and dalteparin 200 units/kg was started and he was transitioned back to warfarin.

DISCUSSION: There are many newer oral anticoagulant agents like dabigatran, rivaroxaban, apixaban, edoxaban that are FDA-approved for DVT and Pulmonary Embolism prophylaxis and treatment. They have been found to be as safe and as efficacious as warfarin by EINSTEIN study(2). Insurers are covering them since they may be cheaper than warfarin management. Since they act by directly binding activated clotting factors, there are no concerns about vitamin K or dietary impact on drug effect. They can be reliably given in a fixed dose for most people. Monitoring is not needed. A therapeutic range has not been defined, and dosage adjustment based on results has not been established. If a dose is missed, there is rapid loss of anticoagulation, in contrast to warfarin where there is lingering effect for an extended period of time. Once the drug is resumed, however, there is an immediate full anticoagulant effect within 2–4 h, again in contrast to warfarin which may take days to re-achieve a therapeutic effect. The reliability of these drugs, given without monitoring or dose adjustment, is based on a GFR of at least 60 ml/min and the absence of potentially interacting medications. Since there are no standardized tests for checking levels, use in people with lower renal function or with potentially interacting medications may result in a different safety profile than reported for most subjects in the clinical studies. Medications to reverse actions of these new oral agents are not commercially available yet. Unlike warfarin, they do not act on vitamin K-dependent mechanisms. Since they directly bind to activated factors, administration of FFP is unlikely to provide benefit. Rivaroxaban has a much shorter half-life than warfarin and after missing just one dose, patients essentially are unprotected. In contrast, missing a single dose of warfarin may drop the INR but still leave some protection from new thrombotic events. A 3 year medication persistence study showed rivaroxaban had better medication persistence as compared to warfarin(1) but more studies are needed. We are likely to see more and more use of the newer anticoagulants. Internists are going to be in

charge of prescribing and managing them. Thus it is important for all primary care providers to be familiar with risks and benefits of the newer anticoagulants and use them for appropriately selected patients.

VESICULAR RASH AND RESPIRATORY FAILURE IN A 28 YEAR-OLD: A CASE REPORT Elaine Cristan; Phoebe King; Adriel Malave; Heather Briggs. The University of Texas Health Science Center at San Antonio, San Antonio, TX. (Tracking ID #2194356)

LEARNING OBJECTIVE #1: Recognize cutaneous and pulmonary manifestations of varicella zoster virus (VZV) in the adult population

LEARNING OBJECTIVE #2: Recommend workup for underlying immunocompromised state in adults who present with disseminated VZV

CASE: A 28 year-old Mexican immigrant presented to the emergency department with 4 days of worsening pruritic skin lesions. He had no prior medical history and was evaluated a few days earlier and prescribed an antihistamine without any relief. Soon after presentation, he acutely developed respiratory distress and was intubated for respiratory failure. On exam, he was febrile to 103 °F, hypotensive with blood pressure of 89/46mmHG, heart rate of 79 beats per minute, and oxygen saturation of 97 % on 100 % fraction of inspired oxygen. He had coarse breath sounds bilaterally and vesicular lesions in different stages were noted on his face, lips and throughout his trunk and extremities. Computed tomography of chest showed diffuse groundglass opacities and nodularity of bilateral lungs. Bronchoscopy further revealed vesicular lesions within his airways. Diagnosis was confirmed with positive direct fluorescent antibody of skin lesions for varicella zoster and positive varicella zoster virus (VZV) polymerase chain reaction from bronchial washing. Further testing revealed a positive human immunodeficiency virus (HIV) with a viral load of 424,000copies/mL. Remainder of infectious workup including tuberculosis, fungal serologies and *Pneumocystis jirovecii* was negative. Patient initially received broad antimicrobial therapy on admission, including intravenous acyclovir, which was narrowed to acyclovir alone on day 2. Within the first 24–48 h, patient rapidly improved and was extubated on day 4 to room air. As the patient showed rapid improvement, he was discharged on day 5 with oral acyclovir to complete a total of 7 days of treatment with plans to start antiretroviral therapy after discharge.

DISCUSSION: Varicella is a disease caused by VZV and is one of the most common and highly contagious infections in childhood. When it does present in the adult population it is associated with increased morbidity and mortality. Treatment of choice is Acyclovir at 10 mg/kg every 8 h for a total of 7 days. If therapy is not initiated promptly, patients may require mechanical ventilation and are at increased risk of mortality. Workup for risk factors is also recommended, which in this case, HIV was diagnosed in the subsequent workup. Per guidelines, in the HIV patient population, long-term prophylaxis of varicella with antiviral drugs is not recommended. Also, initiation of antiretroviral therapy can be considered, in addition to intravenous acyclovir for severe varicella. With the development of the VZV vaccine, the incidence has decreased dramatically in all populations; therefore it is also less commonly seen in the inpatient population. There are currently no studies of the vaccine in HIV-seropositive adults but could be considered in VZV-seronegative patients with CD4 counts greater than 200 as a preventive strategy as per the Centers for Disease Control and Prevention. Although the vaccination is extensively used in the United States and Canada, in other countries, such as Mexico, the VZV vaccine is not commonly implemented leading to continued prevalence of varicella infections. Therefore, in a hospital where migrant workers or immigrants make up a portion of the patient population, it is vital as a hospitalist to recognize the cutaneous and pulmonary complications of VZV.

WALK IT OFF: AN INTERESTING CASE OF FOOT PAIN Karthik J. Kota; Amar Kohli. UPMC, Pittsburgh, PA. (Tracking ID #2197249)

LEARNING OBJECTIVE #1: Describe the differential diagnosis of uncomplicated limb pain in adult patients

LEARNING OBJECTIVE #2: Recognize the sequelae of arterial hypercoagulability and describe management after an arterial clot has been found

CASE: JJH is a 42 year old man with history of HTN and CKD stage I who presented with right calf pain of five days duration. The patient noticed right calf pain while walking around the hospital to get a CT scan for evaluation of a renal cyst 5 days prior. At the time, he thought it was a muscle strain. He described it as a dull, crampy pain, present at rest and worsened with walking. Associated symptoms included numbness and tingling in his right 1st and 2nd toes, subjective intermittent coolness, and pallor. He denied trauma or edema to the area. Three days prior to admission, JJH noticed acute left sided chest pain and shortness of breath at rest. After an hour, the pain resolved and did not recur. JJH worked as a repairman, denied smoking, played soccer weekly, binge drank (>6) a few times a month, and had a distant history of cocaine use. Family history was notable for a half-sister

with polyarteritis nodosa (deceased age ~8). Physical exam on presentation was significant for a BP of 158/80, palpable right DP pulse, pale and cool 1st-5th right toes with some decreased sensation to light touch, and a tender calf that was soft and without edema or erythema. Lab data showed a normal PT/PTT/INR, a troponin-I of 0.33, a CK-MB of 2.7, and a D-dimer of 776. CT chest with contrast was negative for PE. EKG was notable for Q waves in I, aVL, and V1-V3, alongside flattened T waves in I, TWI in aVL (no priors). Upon admission, he was started on a heparin drip. Cardiac catheterization showed a non-occlusive thrombus in the LAD and diagonal arteries that were reperfused with contrast injection only. Arteriogram of the right common femoral artery showed a filling defect of the right profunda and distal right SFA. Echo revealed antero-apical wall hypokinesis and an LV thrombus; bubble study was negative. JJH had a cut down and embolectomy of the right femoral, tibial, and peroneal arteries. Hypercoagulability workup was negative for FVL, factor 2, LAC, and ANA; JJH was discharged on baby aspirin and warfarin. As of 12/11/14, due to the negative results thus far, autoimmune phenomena such as polyarteritis nodosa are being considered; Heme/Onc plans to see the patient in early February 2015 for continued work-up.

DISCUSSION: This case demonstrates an uncommon manifestation of arterial clotting in a patient presenting with right calf pain. The differential for non-traumatic limb pain can be divided into infectious, neurologic, musculoskeletal, and vascular etiologies. Given JJH's lack of systemic or localized symptoms, infectious etiologies were ruled out. Neurologic causes (e.g., radiculopathy, neuropathy, plexopathy) were unlikely due to the lack of inciting events (e.g., recent heavy exercise, diabetes, birth trauma/defect) and the nature of the pain (neuropathic pain usually being less "crampy," more "burning"). In a self-described "fit" 42 year old, musculoskeletal etiologies (e.g., muscle cramps, shin splints, inflamed/torn muscles) might be the obvious diagnostic route. However, a careful history would have elicited both his half-sister having PAN and his past cocaine abuse, while a focused neurologic exam of the leg would have revealed decreased sensation in his toes. Acute vascular etiologies can be subdivided into venous (cramping pain, erythema, warmth) and arterial (pale/cold limb, cramping/burning pain, pulselessness, paresthesias) insufficiency. JJH did not present with these classic symptoms initially, likely due to his good physiologic reserve and presence of collaterals; however, there were clues pointing towards a vascular etiology even during his CT. Work-up for an arterial clot centers around determining thrombus versus embolus and determining a hypercoagulable etiology. A TTE/TEE helps with the former by ruling out endocarditis, paradoxical emboli, and atrial/ventricular wall thrombi; in JJH's case, it was thought that the LV clot formed initially due to hypercoagulability, and the patient's subsequent MI and acute limb ischemia were due to emboli from this. Work up then focuses on various genetic (e.g., FVL deficiency, antiphospholipid syndrome) and autoimmune diseases (e.g., SLE, PAN). Initial work-up has been negative for JJH. In terms of management, after the patient was immediately placed on heparin, the next decision was for thrombolytics versus surgical revascularization. Determination in a young, healthy patient with embolus is location of the clot: distal is better treated with thrombolytics, while proximal is more a candidate for surgery. Finally, after dealing with the clot, if no provoked etiologies are found, patients must be kept on lifelong anticoagulation (with the added bonus of effectively treating JJH's LV clot).

WELLENS' SYNDROME IN A YOUNG JAMAICAN INDIAN MALE
Aditya S. Pawar^{1, 3}; Priyanka T. Bhattacharya^{2, 3}; Rajiv Bhattarai^{1, 3}. ¹Mercy Catholic Medical Center, Darby, PA, U.S.A., Philadelphia, PA; ²Mercy Hospital of Philadelphia, Philadelphia, PA; ³Drexel University College of Medicine, Philadelphia, PA. (*Tracking ID #2199358*)

LEARNING OBJECTIVE #1: Recognize Electrocardiographic(EKG) changes of Wellens' syndrome to prevent Acute Myocardial Infarction.

LEARNING OBJECTIVE #2: Recognize increased susceptibility of young, healthy Indo-Jamaicans to Coronary Artery disease especially Wellens' syndrome due to genetic predisposition compared to whites.

CASE: A 33 year old Indo-Jamaican male, smoker with past medical history of gastritis on Prilosec, presented to Emergency Department with sub sternal chest pain that was intermittent, 10/10, non-radiating and associated with nausea and diaphoresis, relieved by nothing. Patient denied having similar episodes of chest pain in the past or any positive family history. Vitals on presentation were BP of 113/53, Pulse 52, Respiratory rate 18, Temperature 97.5, oxygen saturation of 99 % on room air. Physical examination was unremarkable. Initial EKG revealed biphasic T waves in leads V1, V2 and V3 and T wave inversions in leads II, III and aVF. The initial troponin I concentration was 0.11 with total cholesterol of 246 and LDL of 175. The patient was immediately taken for percutaneous coronary intervention. Coronary angiography revealed stenosis of 80 % of the mid- left anterior descending artery which was successfully treated with a drug eluting stent. His troponin I after revascularization was 0.09 ng/ml and EKG revealed new T wave inversions evident in V1, V2 and V3. He had an unremarkable hospital course after revascularization. 2D echocardiogram showed a left ventricular ejection fraction of 60-65 %, bicuspid aortic valve and no wall motion abnormalities. The patient was started on Brilinta, Aspirin, Statin and Carvedilol. Patient was discharged after receiving smoking cessation counseling and Cardiac Rehabilitation referral.

bicuspid aortic valve and no wall motion abnormalities. The patient was started on Brilinta, Aspirin, Statin and Carvedilol. Patient was discharged after receiving smoking cessation counseling and Cardiac Rehabilitation referral.

DISCUSSION: Wellens' syndrome was first described as a potentially unrecognized EKG manifestation of critical proximal Left Anterior Descending Artery (LAD) stenosis in patients with unstable angina pectoris in a chest pain-free period. This syndrome is a preinfarction condition of coronary artery disease with a high predictive value for the development of acute myocardial infarction. Diagnostic criteria includes: Biphasic or deeply inverted T waves in leads V2 and V3; occasionally in leads V1, V4, V5 and V6; No or minimal ST elevation (<1 mm); No or minimal elevation of cardiac enzymes; No loss of precordial R-wave progression; No pathological precordial Q wave and history of angina. There are two types, Type 1, encompasses 76 % of patients who have deep symmetrical inverted T waves in V2 and V3, often in V4, V5 and sometimes in V6. The type 2 have biphasic T waves in lead V2 and V3 and this exists in about 24 % of the patients and is accompanied by a greater level of lethality. These patients are at risk of myocardial infarction and sudden death, and early revascularization is recommended. The patient reported here had all the criteria of Wellens' syndrome but also had some uncommon features. First, on admission the typical EKG pattern of Wellens' Syndrome was accompanied with sinus bradycardia and T wave inversions in inferior leads. Second, the critical stenosis was found in the middle rather than the proximal part of LAD. Third, our patient had no past medical history of cardiac disease. In addition, our patient had EKG changes from Wellens' type 2 to type 1 post revascularization. The importance of biphasic T waves may sometimes be overlooked in emergency department settings, with these kind of findings frequently being reported as nonspecific ST-T wave changes. It is also imperative to do serial EKGs or EKG monitoring in patients with unstable angina in a chest pain-free period. An ergometer stress test is contraindicated in these patient because it can lead to anterior myocardial wall infarction. The presented patient had no prior medical history of chest pains, and being low risk, the EKG findings could be presumed unimportant, but coronary angiography showed severe mid LAD stenosis. The patient was immediately stented and lethal outcome was prevented. Although our patient showed EKG changes typical of Wellens' Syndrome, the critical lesion was found to be in the middle part of LAD. Patients such as this may be a subgroup of Wellens' Syndrome, but this would need to be clarified in a larger case series. It has been shown in studies that young healthy patients of Indian origin are at increased risk of CAD compared to whites due to a genetic susceptibility, mediated through elevated levels of lipoprotein(a) which magnifies the adverse effects of lifestyle factors. It is not known if the same set of patients are prone to develop Wellens' changes specifically. A more aggressive approach to prevention and treatment is warranted in these patients to prevent fatal outcomes. Presented case underlines the importance of mentioned EKG changes to indicate the site of the critical stenosis and genetic susceptibility being an important factor in risk stratification of a patient.

WHAT HAPPENS TO VAGUS DOESN'T NECESSARILY STAY IN VAGUS...

Bradley Anderson; Andrew Greenlund. Mayo Clinic, Rochester, MN. (*Tracking ID #2158477*)

LEARNING OBJECTIVE #1: Recognize altered gallbladder kinetics, manifested by chronic postprandial abdominal pain, as a complication of left-sided surgical vagotomy.

CASE: A 35-year-old woman presented for the outpatient evaluation of a 3-month history of postprandial abdominal discomfort and vomiting. One month prior to the onset of her symptoms, the patient had been diagnosed with a left jugular foramen schwannoma on a MRI of the head and neck performed as part of the evaluation for a several-year history of dysphagia. Subsequently, a left level II and III dissection with transmastoid exposure of the jugular foramen was successfully performed to facilitate tumor removal. Intraoperatively, EMG monitoring of cranial nerves VII, X, XI, and XII was performed; as the left vagus and spinal accessory nerves (cranial nerves X and XI) were found to be involved in tumor, the patient sustained unilateral transection of both nerves in the process of tumor resection. One month after surgery, the patient experienced the onset of nausea and large-volume emesis consisting of undigested food with the onset of symptoms beginning approximately 4-6 h after meals, preceded by epigastric discomfort. She quantified her symptoms as occurring on average 6 times per month with noted worsening after consumption of fatty foods, bread, acidic foods, chocolate, or pre-prepared food. Physical examination yielded a soft, non-distended abdomen with gastric sounds present; no guarding, rebound, or bruits were noted. As the patient had described emesis with undigested food, both a gastric emptying scan and small bowel nuclear medicine transit study were performed and were normal. With symptomatic persistence, an EGD was performed and was additionally unremarkable for esophagitis or obstruction; a pH probe placed on endoscopy also yielded normal results following a 48-h monitoring period. Subsequent abdominal ultrasound demonstrated a partially contracted gallbladder and a follow-up abdominal CT re-demonstrated gallbladder contraction without additional intra-abdominal pathology. Following outpatient surgical evaluation, the patient proceeded to

cholecystectomy for diagnostic and therapeutic intent. Post-operative surgical pathology confirmed chronic cholecystitis as typically is seen in the setting of chronically altered gallbladder kinetics. On several follow-up visits after surgical recovery, the patient has reported complete symptomatic resolution.

DISCUSSION: Sustained postprandial gallbladder contraction is a rare and frequently unrecognized complication of left-sided surgical vagotomy. As the left vagus nerve principally governs gallbladder parasympathetic motor function, compromise of its innervation predisposes to cholecystokinin sensitivity resulting in sustained contraction. Though vagotomy has historically been associated with these alterations in gallbladder kinetics, it serves as a historic clue that can be overlooked in patients presenting with chronic abdominal discomfort. This case illustrates the importance of thorough history gathering and contextualization of historical comorbid conditions, surgical history, and seemingly unrelated symptoms. As the change in gallbladder kinetics following left-sided vagotomy can predispose to chronic cholecystitis, earlier recognition of this association may have facilitated expedited symptomatic relief and minimized unnecessary diagnostic evaluation.

WHEN 'BETA' DOESN'T MAKE YOU BETTER: A CASE OF INHALED ALBUTEROL-INDUCED STRESS CARDIOMYOPATHY Opeyemi Fadahunsi; Oluwaseun Shogbesan; Anene Ukaigwe; Adetokunbo Oluwasanjo. Reading Health System, Reading, PA. (Tracking ID #2193983)

LEARNING OBJECTIVE #1: Recognize excessive inhaled albuterol use as a cause of stress cardiomyopathy

CASE: Fifty-three year old male with moderate persistent asthma was admitted for acute asthma exacerbation and atypical substernal chest pain. A week prior to presentation, he had been requiring albuterol inhaler more than six times daily. He was not compliant with his controller fluticasone/salmeterol due to cost issues. Risk factors for coronary artery disease (CAD) were male sex and older age. TIMI risk score was 1. He had no history of pheochromocytoma or myocarditis. He denied cigarette smoking, alcohol or recreational drug use. On examination, respiratory and heart rates were 24 and 112 per minute respectively. Blood pressure and oxygen saturation were within normal limits. Cardiopulmonary examination revealed diffuse expiratory wheezes. The rest of the physical examination was normal. Chest X-ray was unremarkable. He was placed on bronchodilator nebulizer treatment as well as systemic steroids. Troponin I was 0.97 but subsequently peaked at 2.85 (normal ≤ 0.06 ng/ml) 4 h later. Electrocardiogram (EKG) showed sinus tachycardia with no other abnormalities. Serial EKGs remain unchanged. Transthoracic echocardiogram (TTE) revealed left ventricular (LV) systolic dysfunction, LVEF of 36 % with mid to distal hypokinetic segments but preserved basal segment. Left heart catheterization done to evaluate new hypokinetic segments revealed normal coronaries. He was discharged after resolution of his asthma exacerbation on controller medications to prevent further recurrence and carvedilol and lisinopril for LV systolic dysfunction. He will follow up in 3 months with a repeat TTE to assess LV function.

DISCUSSION: Stress cardiomyopathy (SCM) is a known clinical syndrome resulting from psychosocial or physical stress. The underlying pathophysiology is linked to elevated plasma catecholamine levels. The mechanism of injury is incompletely understood and proposed mechanisms include myocardial stunning, microvascular dysfunction and direct cardiac myocyte toxicity. SCM is usually reversible after resolution of stress event. In the case described above, a repeat TTE was scheduled in the outpatient setting. Beta-agonists are associated with increased cardiac events including cardiomyopathy and ischemic heart disease. Although, albuterol selectively stimulates beta-2 adrenergic receptors, this selectivity is lost at higher doses accounting for cardiac effects. There are increasing reports linking inhaled beta-2 agonists to SCM. This highlights the importance of appropriate controller medications in patients with increasing frequency of asthma symptoms. Our patient exhausted a 3 month supply of inhaled albuterol within a week for moderate persistent asthma. It is also important to note that SCM can reoccur and can be potentially fatal. Therefore, alternative medications should be recommended for control of asthma attacks. In conclusion, in the setting of low pretest probability for CAD and excessive inhaled albuterol use, findings of elevated troponin and depressed LV function should raise the possibility of albuterol-induced stress cardiomyopathy.

WHEN A MURMUR IS NOT JUST A SOUND: DIAGNOSING CARCINOID SYNDROME Min Ji Kim; Maulin Shah; Muneza Muhammad. Baylor College of Medicine, Houston, TX. (Tracking ID #2198943)

LEARNING OBJECTIVE #1: Recognize heart failure as an initial presentation of carcinoid syndrome.

LEARNING OBJECTIVE #2: Diagnose carcinoid syndrome through definitive modalities following a new physical exam finding of tricuspid and/or pulmonic valve murmur(s).

CASE: The patient is a 33-year-old Caucasian male who was referred to a cardiologist when a new heart murmur was identified by his primary care physician. He was in his usual state of health until 4 years prior to presentation when he developed gradual but slowly progressive dyspnea on exertion. He also began to have random episodes of flushing without identifiable social triggers or stressors. For the past year he has had a chronic non-productive cough with intermittent wheezing. In more recent months, he developed abdominal discomfort, watery diarrhea occurring throughout the day and during sleep, and bilateral lower extremity edema. He had lost 23 kg weight loss in the past year. He denied any illicit drug use. Physical exam was notable for a holosystolic murmur along the left sternal border that increased in intensity with inspiration and a parasternal heave along the left lower sternal border. Jugular venous pressure was elevated. Soft wheezes were heard in bilateral upper lung lobes. A pulsatile liver was noted. He also had pitting peripheral edema of the lower extremities. Echocardiogram revealed an enlarged right ventricle and atrium, severe tricuspid regurgitation with a thickened valve and restricted motion of the leaflets, moderate pulmonary hypertension, mild pulmonary valve stenosis, and paradoxical septal motion. While imaging the inferior vena-cava, incidental hepatic masses were seen. CT and MRI delineated multiple large hepatic masses. High levels of 5-HIAA were detected in urine. An octreotide scan showed focal uptake a small lesion in the duodenum. Ultrasound-guided biopsy results of a liver lesion confirmed carcinoid tumor. Treatment with intramuscular octreotide was initiated and evaluation for valvular surgery was scheduled.

DISCUSSION: Heart failure is an uncommon presentation of carcinoid syndrome and requires a high index of suspicion for evaluation. Only 5–10 % of patients with carcinoid tumors develop symptoms of carcinoid syndrome, and about 50 % of those with carcinoid syndrome develop carcinoid heart disease involving the tricuspid and pulmonic valves. Therefore, in a patient with a new-onset heart murmur and signs of right-sided heart failure, obtaining an echocardiogram and involving a cardiologist early are important first steps for diagnosis and treatment. Unfortunately, due to initially subtle symptoms, many cases of carcinoid are diagnosed incidentally. In the case of carcinoid syndrome causing heart disease, a poor prognosis is associated with valvular involvement, with valvular surgery offering limited mortality benefit. While the symptoms of carcinoid syndrome can be treated with octreotide or other various agents, the decision regarding the appropriate time point at which valvular surgery should be pursued must be made on a case-by-case basis. Early coordination among oncology, cardiology, and cardiothoracic surgery specialties are imperative for expedient treatment of carcinoid heart disease.

WHEN A PHYSICAL EXAM POINTS TO THE WRONG DIAGNOSIS: GOUT MASQUERADING AS RHEUMATOID ARTHRITIS Devin B. Malik; Sukhpreet Singh; Akshay Amaraneni. Western Michigan University School of Medicine, Kalamazoo, MI. (Tracking ID #2198575)

LEARNING OBJECTIVE #1: To recognize that the typical findings in rheumatoid arthritis can be found in other rheumatologic conditions

CASE: Seventy-four years old African American lady presented with urinary tract infection complicated by sepsis and acute kidney injury. After patient returned to baseline with appropriate management, rheumatology was consulted for bilateral hand and foot pain with deformities. Patient admitted to approximately 15 years history of morning stiffness lasting 30–60 min, along with recent onset joint swelling and pain in all metacarpophalangeal joints as well as bilateral first metatarsophalangeal joints. On exam patient had ulnar deviation, swan neck deformities on second through fifth digits as well as cock up and hammer toes all consistent with RA. However, serology was negative for rheumatoid factor and cyclic citrullinated peptide. X-ray showed "rat bite lesions" and joint aspiration revealed monosodium urate crystals confirming the diagnosis of gout.

DISCUSSION: Polyarticular gout is an inflammatory arthritis that is often misdiagnosed as another form of destructive arthritis such as Rheumatoid Arthritis (RA). Diagnosing gout often requires quick recognition by clinicians in order for a correct diagnosis. Physical exam findings are paramount in aiding clinicians evaluate patients for suspected diagnoses. The textbook finding of swan neck deformity is almost always indicative of RA. However, any destruction of the flexor and extensor tendon of the finger can cause the deformity, including gout as in our patient.

WHEN ANTICOAGULATION ISN'T ENOUGH: EFFORT RELATED VENOUS THROMBOSIS Tala Achkar¹; Gregory M. Bump². ¹UPMC, Pittsburgh, PA; ²University of Pittsburgh School of Medicine, Pittsburgh, PA. (Tracking ID #2188648)

LEARNING OBJECTIVE #1: 1) Recognize causes of upper extremity DVT that require therapy beyond simple anticoagulation

LEARNING OBJECTIVE #2: 2) Diagnosis and management of Paget-Schroetter syndrome

CASE: The patient is a 48-year-old man with a history of hypothyroidism and a remote history of testicular cancer, who presented with left upper extremity (LUE) swelling and tingling. The patient reported exercising at a gym 2 days prior to presentation and completing a chest work out including 75 pushups. Afterwards, he noticed swelling of his LUE that worsened over the next day, associated with cyanosis of the limb. The day of presentation, he noticed paresthesias in the 3rd to 5th digits of his left hand. He denied any previous history of DVT, any history of manipulation of the vessels of the LUE including port placement, IVs, etc. During routine follow up for testicular cancer, he was considered cured. He denied a personal or family history of hypercoagulable state or thrombosis. Physical exam was notable for LUE edema from the upper arm to the wrist with associated overlying erythema. He had no palpable cord, and 2+ radial pulses. The limb was warm, well perfused, and without cyanosis. There was no facial edema or venous distention of the neck or chest veins. The patient was thought to have Paget-Schroetter syndrome (PSS), previously known as effort thrombosis, based on history, and clinical appearance. The patient was started on a heparin drip followed by an upper extremity venous doppler that did not reveal thrombosis, however, the proximal subclavian could not be visualized by doppler. Vascular surgery performed a venogram which showed severe subclavian vein stenosis near the costoclavicular junction with thrombosis. Balloon angioplasty and tPA thrombolysis were performed, followed by Angiojet thrombectomy of the subclavian vein. Enoxaparin was initiated with complete resolution of the thrombus. On follow up with the vascular surgeon it was noted that his first ribs bilaterally were quite prominent, and that although the subclavian vein was patent, there was extrinsic compression at the thoracic outlet. The patient underwent left first rib resection, with anterior scalenectomy and thoracic outlet decompression.

DISCUSSION: PSS is an uncommon cause of thrombosis in the subclavian vein, but when it occurs, it is seen in the dominant arm of patients who are physically active particularly in the setting of excessive overhead activity. The pathophysiology is similar to compression syndromes, where the subclavian vein is compressed in the costoclavicular space which leads to stagnation of blood flow. Then, with activity there is repetitive microtrauma to the venous endothelium, which leads to initiation of the coagulation cascade and venous thrombosis as well as thickening and fibrosis of the vessel [1, 2]. Early on, the patient can describe a "bursting feeling" in the affected limb, and this is secondary to venous hypertension [2]. As the thrombosis occurs in the proximal subclavian vein, which is obscured by the clavicle, upper extremity doppler has a sensitivity of 78–100 % and a specificity of 88–100 % when done correctly [1]. The initial treatment is catheter-directed pharmacologic or mechanical thrombolysis, with repeat venograms to check for resolution of the thrombus [1, 3]. If thrombolysis is successful, the patient should be therapeutically anticoagulated on heparin until rib resection, followed by therapeutic LMWH at the discretion of the surgeon [2]. There are no clear guidelines on anticoagulation following rib resection with different regimens including aspirin alone or warfarin alone [2]. Since the management differs significantly from a typical upper extremity thrombosis, it is important these patients be recognized and referred to vascular surgery as early as possible. The optimal treatment window for these patients is 2 weeks, after which the patient may suffer significant disability with a high risk of post-thrombotic syndrome (up to 46 %) [4].

WHEN CD4 LYMPHOCYTES DISAPPEAR Ashlee Metcalf¹; Lawrence Dubuske².

¹George Washington University, Alexandria, VA; ²George Washington University, Washington, DC. (Tracking ID #2200607)

LEARNING OBJECTIVE #1: 1. Describe an association between an autoimmune process, angioedema and CD4 lymphocytopenia

CASE: A 42 year old Caucasian female with past medical history of seasonal allergies presented to allergy clinic with recurrent episodes of angioedema. She initially presented complaining of angioedema of the lower lip and inner cheek after eating chicken and a baked potato. One year later she presented after two more episodes of angioedema; once after eating spinach and artichoke soup and once after eating crab dip and grilled shrimp with lower lip swelling. She denied hives, pruritus, throat closing sensation, shortness of breath, wheezing, cough, chest tightness, nausea, vomiting, diarrhea, abdominal pain, and lightheadedness. The swelling gradually resolved within 24 h, using diphenhydramine 25 mg orally immediately after onset of symptoms. On exam, lungs were clear and no evidence of a rash on skin exam but had dermatographic skin responses to stroking her skin. Skin prick tests was positive for tree pollen, dust mite, weed pollen, and cat; and negative to orange, cashews, chicken, shellfish, scaled fish, potato, peanut, egg, soy, garlic, onion, spinach, lemon, orange, and potato. She had slightly elevated allergen specific IgE to spinach (0.35 kU/L) and artichoke (0.14 kU/L) with Total IgE of 26 kU/L. C4 levels were repeatedly normal (16/17 mg/dl) as were C1 esterase inhibitor levels (26/31/35 mg/dl) and C1 esterase functional levels (83 %/97 % normal) excluding C1 esterase inhibitor deficiency. Anti-thyroid antibodies revealed Hashimoto's Thyroiditis (anti-TPO 150 IU/ml and anti-Thyroglobulin 17.6 IU/ml) but normal T3 (95 to 114 ng/dl) and normal T4 (6.5 mcg/dl) with elevated TSH (6.83/8.2 uIU/ml) consistent with thyroid hormone

insufficiency. Repeatedly low absolute CD4 counts (72/76/67/85) were noted, with negative studies for HIV-1, negative HTLV 1/2 and negative Hepatitis B/C panel. The consistently low CD4 levels meet the criteria for the diagnosis of idiopathic CD4 lymphocytopenia.

DISCUSSION: Idiopathic CD4 lymphocytopenia (ICL) is a rare disorder defined by the Centers for Disease Control as a documented absolute CD4 T lymphocyte count of less than 300 cells per cubic millimeter or less than 20 % of total T cells on more than one occasion. The patient must also have no evidence of HIV or any defined immunodeficiency or therapy associated with depressed levels of CD4 T cells. ICL is associated with opportunistic infections and autoimmune disease. This patient presented with recurrent facial angioedema, and was found to have labs consistent with ICL occurring along with Hashimoto's thyroiditis. Hashimoto's thyroiditis can be associated with increased T cell turnover and urticarial angioedema. This case shows a rare presentation of ICL, with a patient presenting with angioedema initially thought to be secondary to food allergy later found to have Hashimoto's thyroiditis and CD4 lymphocytopenia. Based on elevation in TSH, she was treated with low dose levothyroxine with complete resolution of her angioedema, reduction in her dermatographic skin responses and interestingly, some improvement in her absolute CD4 cell levels now ranging from 119 to 123. She no longer uses any antihistamines and has not developed any opportunistic infections.

WHEN THE PICTURE IS NOT WORTH A THOUSAND WORDS Hao Chi Zhang; Matthew Novakovic; Ihab Hamzeh. Baylor College of Medicine, Houston, TX. (Tracking ID #2198996)

LEARNING OBJECTIVE #1: Assess a patient presenting with typical angina

LEARNING OBJECTIVE #2: Recognize the limitations of cardiac stress testing

CASE: A 57-year-old Hispanic woman underwent pre-operative cardiac evaluation for bilateral blepharoptosis. She had a history of well-controlled diabetes mellitus type 2, diastolic heart failure with preserved left ventricular ejection fraction, hypertension, 44-pack-year smoking, hypothyroidism, chronic back pain, and obesity. She reported having had new chest pain for over 2 weeks. The chest pain was substernal and pressure-like, radiating to the left shoulder. The pain was associated with dyspnea, nausea, palpitations, and exhaustion. The pain had been worsening in frequency and intensity; it had occurred at rest 2 days prior to evaluation. She did not take daily aspirin and was not prescribed nitroglycerin. The patient did not drink alcohol or use cocaine. She had no family history of premature coronary artery disease (CAD). On physical examination, the patient was afebrile with a blood pressure of 131/72 mm Hg, a pulse of 56/min, normal respirations and oxygen saturation, and a body mass index of 45 kg per square meter. Except for mild bradycardia, the cardiac exam was otherwise normal; there were no gallops or pericardial rubs. There was no elevation in the jugular venous pressure. The pulmonary exam was also normal without evidence of rales. The patient's electrocardiogram (ECG) demonstrated sinus bradycardia without T-wave inversions or ST-segment changes. Results of the metabolic panel was within normal limits. The levels of cardiac enzymes were normal. Her probability of CAD was intermediate. In light of her chronic back pain, pharmacologic ECG stress testing with regadenoson and myocardial perfusion imaging (MPI) were pursued. The stress test did not elicit chest pain, and there were 0.5-mm ST-depressions in inferolateral leads. The MPI was interpreted as normal with homogeneous tracer distribution throughout the myocardium. Nonetheless, the history was consistent with unstable angina. The patient underwent coronary angiography, which demonstrated 80 % proximal left anterior descending artery stenosis, 80 % proximal left circumflex stenosis, 80 % mid-left circumflex stenosis, 70 % second obtuse marginal stenosis, and non-obstructive atherosclerotic disease of the proximal right coronary artery (right-dominant). The patient underwent two-vessel coronary artery bypass grafting (CABG) and was discharged 2 weeks post-operatively in stable condition.

DISCUSSION: This patient had presenting symptoms that were highly suggestive of unstable angina. The cardinal features of typical angina should be explored in all patients presenting with chest pain. The TIMI risk score can help risk-stratify, but the score should not be interpreted in isolation. Perfusion defects can be evaluated using gated single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI). Pharmacologic SPECT MPI has a reported sensitivity of 83 to 97 %. In this case, the critical step was acknowledging unstable angina despite the MPI being interpreted as normal. The sensitivity of the test can also be affected in cases of diffuse balanced ischemia, a relatively rare phenomenon seen in triple-vessel CAD where all the nuclear counts appear equally low. Evaluating left ventricular dilatation by assessing the transient ischemic dilatation index on post-stress images may be able to unmask diffuse ischemia. Soft tissue attenuation by the diaphragm, breast tissue, or adipose tissue may also decrease the accuracy of MPI. Furthermore, perfusion defects may be masked by adjacent intense tracer uptake in the bowel resulting in reconstruction artifacts. In conclusion, this patient's case illustrates an important situation in which the patient's history taking priority over results of unrevealing initial cardiac tests allowed for a diagnosis of significant CAD requiring CABG.

WHEN THE TREATMENT BECOMES THE PROBLEM Simeng Sun; Patricia Dharapak. Mount Sinai Beth Israel, New York, NY. (Tracking ID #2193925)

LEARNING OBJECTIVE #1: Recognize drug-induced immune thrombocytopenia in acute thrombocytopenia

LEARNING OBJECTIVE #2: Assess aztreonam as a potential cause of drug-induced immune thrombocytopenia

CASE: A 61-year-old male with traumatic brain injury, paraplegia, HCV cirrhosis and a cephalosporin allergy presented with hematemesis secondary to esophageal varices. His hospital course was complicated by aspiration pneumonia and empiric treatment with Vancomycin, Aztreonam and Metronidazole was initiated. On the 6th day of antibiotic therapy, the patient's platelet count acutely dropped from a baseline of 130 K/UL to 3 K/UL. There was new hematuria but no signs of clinically significant bleeding. All antibiotics were stopped and 2 units of platelets were transfused without response. Workup for hemolysis, DIC, HIT and TTP was negative. Peripheral smear was unremarkable. HIV was nonreactive. Within 2 days of antibiotic cessation, the platelet count rose to 35 K/UL and recovered to 172 K/UL at the time of discharge one week later without additional therapy. Given the time course and improvement after drug cessation, Vancomycin-induced immune thrombocytopenia was considered. Four months later, the patient presented with sepsis secondary to pneumonia. Empiric treatment with Linezolid, Aztreonam and Metronidazole was initiated. Within 3 days of antibiotic exposure, the patient's platelet count dropped from 160 K/UL to 2 K/UL. Linezolid was discontinued and 3 units of platelets were transfused without response. On the following day, Aztreonam was substituted with Imipenem to complete the antibiotic course. As a result of new petechiae and oral mucosal bleeding, 2 doses of IVIG were given with good effect. The platelet count recovered to 34 K/UL immediately following treatment and improved to 123 K/UL by the time of discharge 3 weeks later. Evaluation for hemolysis, DIC, HIT and TTP was again negative. Given the time course, an immune mediated process from re-exposure to myelosuppressive drugs in the setting of sepsis was presumed as the cause of the acute thrombocytopenia. Aztreonam was favored as the culprit since Linezolid-induced thrombocytopenia usually occurs after more prolonged treatment (>2 weeks)

DISCUSSION: In acutely ill patients, drug-induced thrombocytopenia (DITP) can often be overlooked because thrombocytopenia is generally attributed to sepsis or another underlying condition (e.g., chronic HCV or cirrhosis). Like other idiosyncratic drug-sensitivity reactions, only a small fraction of exposed patients will develop DITP and no predisposing factors have been identified. The mechanism of platelet destruction is usually by drug-induced antibodies but testing is often not readily available. A careful history and a high index of suspicion are crucial for timely diagnosis. At least one week of exposure to the sensitizing drug is needed before thrombocytopenia is clinically evident (i.e., petechial hemorrhages and ecchymoses). Catastrophic bleeding is unusual but fatal intracranial and intrapulmonary hemorrhage, DIC, renal failure, HUS and TTP have been reported. After the culprit drug is discontinued, bleeding symptoms usually subside within 1–2 days and platelet counts normalize in 4–8 days but rarely, thrombocytopenia may persist for several weeks to even years. Corticosteroids, IVIG and plasma exchange have been used with uncertain benefit. Fortunately, drug-induced antibodies tend to be specific to the sensitizing drug and patients usually tolerate structurally different pharmacologic equivalents. As the drug sensitivity probably persists indefinitely, patients should be advised to permanently avoid the medication and the medical record should be updated to reflect this reaction. In review of our patient's clinical course, Aztreonam was the likely culprit in both cases of DITP. While previously described as causing myelosuppression, to our knowledge we are the first to describe isolated thrombocytopenia in association with Aztreonam use. While uncommon, DITP can be devastating but preventable by simply discontinuing the causative drug. This phenomenon should be considered in any patient with acute thrombocytopenia of uncertain etiology

WHERE THE FANCONI DID THE PHOSPHATE GO? Talia R. Kahn¹; Ryan Laponis². ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA. (Tracking ID #2190378)

LEARNING OBJECTIVE #1: Utilize a systematic approach to evaluating hypophosphatemia

LEARNING OBJECTIVE #2: Recognize antivirals as a cause of Fanconi's syndrome and hypophosphatemic osteomalacia

CASE: A 66 year-old man with a history of chronic hepatitis B (HBV) and hepatocellular carcinoma (HCC) presented with hypophosphatemia. Nine years prior to presentation, he was diagnosed with HBV associated cirrhosis and HCC and started on lamivudine with subsequent addition of adefovir. Two years later, he underwent liver transplantation and was noted to be hypophosphatemic. Over the ensuing 7 years, he continued to be hypophosphatemic and fractured his ribs walking into a banister, developed kyphoscoliosis and debilitating pain in his back and hips, and was diagnosed with

metastatic HCC. On exam, he was 5'4" although at one time was 5'9". He was kyphotic with a bell-shaped chest. Liver was non-palpable. Labs showed 7 years of hypophosphatemia. He had an elevated fractional excretion of phosphate with a normal serum parathyroid hormone, calcium, and calcitriol. His bone specific alkaline phosphatase was elevated, and he had a high urinary glucose, normal plasma glucose, an inappropriately normal urinary uric acid in the setting of a low serum uric acid, and elevated urinary amino acids. Based on these results, he was diagnosed with Fanconi's syndrome and osteomalacia secondary to his adefovir therapy.

DISCUSSION: The causes of hypophosphatemia can be divided into three categories: (1) increased intracellular uptake, (2) decreased intestinal absorption, and (3) renal phosphate wasting. Calculating the urinary fractional excretion of phosphate can help differentiate these causes; when the fractional excretion of phosphate is >5 % it is likely secondary to renal phosphate wasting and when <5 % is likely due to either increased intracellular uptake or decreased intestinal absorption. In this case, the patient was found to have an elevated fractional excretion of phosphate, placing him in the category of renal phosphate wasting. The main causes of renal phosphate wasting include: (1) primary hyperparathyroidism, (2) secondary hyperparathyroidism due to vitamin D deficiency, and (3) primary renal phosphate wasting. The serum calcium can help differentiate between these etiologies: a high serum calcium indicates primary hyperparathyroidism, a low serum calcium indicates secondary hyperparathyroidism, and a normal serum calcium indicates primary renal phosphate wasting. This patient's normal calcium suggested primary renal phosphate wasting. Primary renal phosphate wasting is generally caused by one of the following: (1) primary renal phosphate wasting syndromes, (2) Fanconi's syndrome, (3) drugs, and (4) malignancy. Distinguishing these etiologies involves determining if the patient has had low phosphate since birth, reviewing the medications, assessing the urinary glucose, uric acid, amino acid and bicarbonate levels, and measuring the calcitriol level, which if inappropriately low in the setting of hypophosphatemia, may suggest tumor-induced osteomalacia. Consistent with Fanconi's syndrome, this patient had an elevated urinary glucose despite his normal plasma glucose, an inappropriately normal urinary uric acid in the setting of a low serum uric acid, and elevated urinary amino acids. Adefovir, tenofovir and cidofovir have been associated with Fanconi's syndrome. Because prolonged severe hypophosphatemia causes inadequate mineralization of the bone matrix, he developed osteomalacia and severe bony pain. The main treatment for Fanconi's syndrome is removal of the offending drug (if there is one) and phosphate repletion. With this, the improper bone mineralization stops and the bone pain improves. Some patients are also eventually able to discontinue phosphate repletion if the damage to the proximal renal tubules is reversible. However, in this case, after 9 years of adefovir treatment, this drug may have irreversibly damaged his proximal tubules.

WHO IS THE CULPRIT?—A CASE OF HYPERCALCEMIA WITH CONCOMITANT SARCIDOSIS AND PRIMARY HYPERPARATHYROIDISM (PHPT) Ricardo Cabello²; Naoka Murakami¹; Alfred Burger². ¹Beth Israel Medical Center, New York, NY; ²Mount Sinai Beth Israel, New York, NY. (Tracking ID #2199105)

LEARNING OBJECTIVE #1: Recognize when to evaluate for primary hyperparathyroidism (PHPT) in the setting of a more obvious cause of hypercalcemia

LEARNING OBJECTIVE #2: Discuss the rationale for the hypercalcemia work-up. Review mechanisms of hypercalcemia

CASE: Case: A 47 year-old female with a history of sarcoidosis, vitamin D deficiency, prior episode of symptomatic kidney stone and bilateral nephrolithiasis, presented with left-sided flank pain radiating to her left leg for 1 day. The patient reported passing a kidney stone a few hours prior. Past medical history revealed that the patient was diagnosed with sarcoidosis with neurologic and pulmonary involvement (bilateral hilar lymphadenopathy and left-sided facial and vocal cord palsy), confirmed with lung biopsy 10 years prior. She had been intermittently treated with prednisone and hydroxychloroquine in the past but was in remission for more than 2 years without medication. Vital signs on presentation were all within normal limits. Physical exam on admission was significant for suprapubic and left-sided flank tenderness to deep palpation. Labs were significant for Ca 11.1 mg/dL (2 years prior Ca levels were normal at 10.4 and minimally elevated at 10.8 mg/dL (normal 8.6–10.4)), Phos 3.7 mg/dL, normal BUN and creatinine. CT scan revealed non-obstructing nephrolithiasis at right ureterovesical junction with mild left hydronephrosis. Patient's pain was controlled, Ca was normalized IV hydration and she was discharged with referral to endocrinology for further work-up. The outpatient work-up for hypercalcemia revealed Ca 11.1 mg/dL, Phos 3.6 mg/dL, Albumin 4.4 g/dL, Alk phos 109 (normal 38–126) U/L, 25-(OH) vitamin D3 total 16 (normal 30–100) pg/mL, 1,25-(OH) vitamin D3 71 (normal 18–72) pg/mL, intact PTH 179 pg/mL. Angiotensin converting enzyme (ACE) 66 (normal 9–67) U/L. The normal range of ACE and clinical picture both supported non-active state of sarcoidosis. The patient was not on supplemental vitamin D on admission, and also exogenous hypervitaminosis D was ruled out by low vitamin D2 levels. The elevated PTH was consistent with primary hyperparathyroidism, and excluded malignancy as a cause in this 47 year old woman. Sestamibi

scintigraphy showed two left parathyroid adenoma and ultrasound confirmed 12-mm and 7-mm hypoechoic hypervascular nodules. Twenty-four hour urinary Ca was 224 mg. Given her age, recurrent nephrolithiasis and osteopenia in DEXA scan (T-score -0.9), patient underwent double parathyroidectomy with normalization of serum Ca.

DISCUSSION: Hypercalcemia in setting of sarcoidosis may have several causes: renal insufficiency, sarcoid-related hypercalcemia (with incidence of 4–11 %), vitamin D supplement for prevention of osteoporosis under steroid treatment, malignancy or concomitant PHPT. Previously, the mild hypercalcemia in our patient was attributed to sarcoidosis. Given that sarcoidosis and primary hyperparathyroidism (PHPT) are both relatively common diseases and may separately contribute to hypercalcemia, it is important to consider when to pursue further evaluation. In our case, given recurrent symptomatic kidney stones, progressive hypercalcemia and inactivity of sarcoidosis, it was decided to evaluate for hyperparathyroidism, and exclude malignancy—both of which were accomplished with a single PTH level. 25-OH vitamin D levels are obtained to establish the context of parathyroid bone disease and to replenish levels pre- and post-operative if vitamin D deficiency is identified. There are multiple mechanisms of hypercalcemia. In sarcoidosis, increased extrarenal production of 1,25-(OH) vitamin D by granulomatous tissue results in increased intestinal calcium absorption as well as bone resorption. However, a cohort study of sarcoidosis showed concomitant PHPT accounts for 8.5 % of hypercalcemia and only 36.1 % had an elevated 1,25-(OH) vitamin D3, which make it difficult to differentiate sarcoid-related hypercalcemia from other causes. If PHPT is present, surgical removal of adenoma is the treatment of choice with 86 % treatment response. It is a challenge for clinicians to identify the major cause or causes of hypercalcemia especially when one has a probable explanation like sarcoidosis. However, as our case illustrates, it is always important to distinguish the cause of hypercalcemia based on clinical and laboratory findings. Given the surprisingly higher than expected incidence in sarcoidosis, physicians may wish to use a lower threshold for the measurement of a single PTH level to exclude hyperparathyroidism in this population.

YOU OUGHTA KNOW THAT BRUGADA Angela Christensen; Julie M. Collins; Pavan Thangudu. Tulane University Health Sciences Center, New Orleans, LA. (Tracking ID #2198340)

LEARNING OBJECTIVE #1: Recognize the diagnostic EKG criteria and clinical criteria for Brugada Syndrome

LEARNING OBJECTIVE #2: Distinguish other causes of ST-segment elevation on EKG

CASE: A 64-year-old man presented after syncope while at rest. The event was witnessed and he was unconscious for less than 3 min. He did not remember the event and was unsure if he had any precipitating factors, prodrome, or associated symptoms. Witnesses denied bowel or bladder incontinence or shaking. He denied any current chest pain or palpitations. He had no previous history of syncopal episode. His past medical history included hypertension and diabetes. He was recently started on hydrochlorothiazide. There was no history of cardiac death in his family. Orthostatic vital signs were negative. He was alert and oriented to person, place, and time. He had a regular rate and rhythm. No cardiac murmur was heard. There was no jugular venous distention. There were no focal findings or evidence of tongue biting. He had grossly decreased sensation to his bilateral upper extremities in a stocking and glove distribution. He also had twitching of his left pectoralis major muscle. His potassium was slightly low at 3.4 mmol/L. His calcium was low at 7.9 mg/dL with a normal albumin. His ethyl alcohol level was 305 mg/dL. His trended cardiac enzymes were negative. His chest x-ray and cat scan of his head showed no abnormalities. His EKG revealed coved ST-segment elevation displaying J-point amplitude followed by a negative T wave in the right precordial leads (V1 and V2). As his ethyl alcohol level decreased, the ST-segment elevation resolved.

DISCUSSION: Brugada Syndrome is a rare autosomal dominant disease that can lead to sudden cardiac death. It is important for the general clinician to recognize the Brugada Syndrome EKG pattern, which has two main variants. In both Type I and Type II Brugada, there is a pseudo-right bundle branch block with 2 mm or more ST segment elevation (J-wave) in the right precordial leads (V1 to V3). Unlike true right bundle branch block, the widened S wave is absent in the lateral leads in Brugada Syndrome. In Type I and Type II Brugada are distinguished by the ST-T wave configuration - “coved” type vs. “saddle back” type. The ST segment elevation in Brugada Syndrome must be distinguished from other causes of ST elevation, which can be benign or serious. The differential includes normal variant repolarization (concave upwards in V2-V6), ST-elevation myocardial infarction, pericarditis (diffuse concave elevations), Prinzmetal’s angina, and hypothermia. After identifying type 1 Brugada pattern and ruling out other causes of ST-elevation, it is important to determine whether the patient has Brugada syndrome. To make this diagnosis a patient must have the type 1 EKG pattern and meet at least one clinical criterion. The three clinical criteria are: sudden cardiac death in a family member younger

than 45 years or EKG type 1 in a family member; arrhythmia related symptoms, which include syncope; or documented ventricular arrhythmias). If the clinical criterion is not fulfilled in the presence of type 1 EKG, this is referred to as idiopathic Brugada EKG pattern. After diagnosing Brugada Syndrome, patients must be risk stratified and treated. The only proven effective strategy to prevent sudden cardiac death is an implantable cardioverter-defibrillator (ICD). In this case, the patient presented with syncope, alcohol intoxication, and an EKG showing type 1 Brugada pattern. It has been discovered that alcohol can unmask the Brugada pattern as in this case. As his blood alcohol level decreased, the pattern began to resolve and then return to normal once his alcohol level was zero. Due to his presentation of syncope of cardiac origin and spontaneous type 1 EKG an ICD was placed. He was also counseled on alcohol cessation. It was recommended that his daughter and siblings have a baseline EKG done and possible EKG with antiarrhythmic drugs.

YOUNG AND WOBBLY Raghd Zeitouni; Thomas Montgomery; James Horton. Carolinas Medical Center, Charlotte, NC. (Tracking ID #2195167)

LEARNING OBJECTIVE #1: Recognize possible causes of acute cerebellar ataxia.

LEARNING OBJECTIVE #2: Manage post-infectious cerebellar ataxia.

CASE: An 18 years old man presented with ataxia and dysarthria. He had suffered a recent injury while playing basketball 3 weeks ago resulting in a grade II splenic rupture, which was managed conservatively. Five days ago, he developed ataxia and dysarthria with development of nausea and vomiting two days later. A computed tomography (CT) of the head without contrast at that time was normal. He returned with persistent symptoms. He reported feeling “off balance” with no headaches, neck pain, focal neurological symptoms, or fevers. He denied a recent viral illness, sick contacts, or recent vaccinations. He had no other past medical history and was on no medicines. He denied any recent alcohol or drug use and was not sexually active. He was afebrile and hemodynamically stable. He was in no acute distress and was alert and oriented x4 but his speech was slightly dysarthric. His neck was supple and had a very subtle torsional nystagmus. He had a wide based gait and fell backwards with Romberg testing. He also had mild dysmetria with finger-to-nose testing on the left and the heel-to-shin test was difficult for him to perform. The rest of his exam was benign including normal sensation and strength, and intact reflexes. His laboratory studies on the day of admission, including white blood count (WBC), electrolytes, liver function tests (LFTs), Thyroid-stimulating Hormone, Vitamin B12, Rapid Plasma Reagen, serum ethanol level and urine toxicology test, were within normal limits. A review of his labs from 3 days ago, however, revealed slight LFT elevations with Alanine Transaminase at 76 IU/L and Aspartate Aminotransferase at 80 IU/L. The patient underwent a repeat CT head which was negative followed by a negative Magnetic Resonance Imaging (MRI) of the brain. Neurology was consulted and a lumbar puncture was performed. The cerebrospinal fluid (CSF) was colorless with only 1 WBC, a glucose of 68 mg/dL, and a protein of 22 mg/dL. The CSF gram stain and cultures were negative and no Varicella Zoster Virus or Herpes Simplex Virus was detected. With a recent splenic rupture and mild hepatitis, a recent Epstein Barr Virus (EBV) infection was suspected. An EBV serology was ordered which revealed a positive EBV viral capsid antigen (VCA) IgM and IgG with a negative nucleic acid IgG indicating an acute EBV infection. The patient was managed conservatively. He showed gradual improvement during his stay and was able to ambulate with assistance prior to being discharged home within a week of admission. He followed up with an outpatient medicine clinic within 10 days of discharge and reported significant improvement in his symptoms. At the time he followed up with a neurologist 3 weeks later, he was back to his normal self and was starting to play basketball again.

DISCUSSION: The patient was presumed to have post-infectious acute cerebellar ataxia secondary to a recent EBV infection. Although he reported no recent symptoms commonly seen with EBV, most patients can be asymptomatic during an acute EBV infection. Acute ataxia can result from structural lesions, vascular disorders, infections, trauma, demyelinating lesions, paraneoplastic processes, toxins, or medications. With normal imaging and CSF, one should also consider post-infectious processes especially in the young. In children, this is mostly related to a Varicella infection. However, in older individuals, EBV is more commonly the preceding infection. Post-infectious EBV associated ataxia usually occurs 1 to 3 weeks post prodrome. Most patients present with predominant cerebellar motor symptoms but could also have cognitive dysfunction. An MRI and CSF analysis are usually normal. Symptoms are usually self-limiting with most patients having complete recovery. Some, however, could take months to improve and others can have permanent symptoms, especially patients older than 60 years of age and with underlying cerebellar atrophy. Considering the self-limiting course, patients are usually managed conservatively although it has been recommended that a more aggressive approach be taken in patients with no improvement within 1 week. Steroids can be effective in some but plasmapheresis or intravenous immunoglobulins are the initial treatment of choice as steroids can sometimes delay a more effective treatment.

YOUNG PATIENT WITH CHEST PAIN, ST ELEVATION, ELEVATED TROPONIN BUT WITH NORMAL CORONARY ARTERIES Tarun Jain¹; Meghan G. Liroff¹; Tariq Turfe¹; Robert Han¹; Kyle Martin¹; Aisha Aslam²; Janak Kansagra¹; Chike Obi¹; Bobak Rabbani¹. ¹Henry Ford Hospital, Detroit, MI; ²Botsford Hospital, Detroit, MI. (Tracking ID #2193273)

LEARNING OBJECTIVE #1: Importance of understanding the pathological process of ECG changes and troponin elevation and possible clinical challenges that arise, when faced with combination of these abnormalities

LEARNING OBJECTIVE #2: Importance of various kinds of imaging modalities in recognizing cardiac pathology

CASE: Twenty year-old male with no previous medical problems presented with 2 days of "pressure-like", intermittent, sub-sternal chest pain radiating to lower jaw. Patient had viral upper respiratory tract symptoms 2 weeks prior to presentation. Patient was afebrile on presentation, with heart rate at 80/min and blood pressure of 146/96 mmHg. There was normal S1 and S2, with no rubs, murmurs or gallops on cardiac exam. Rest of the physical exam was unremarkable. Initial EKG revealed 1–2 mm ST-elevation in the inferior leads. His chest pain improved with aspirin and sub-lingual nitroglycerine. All electrolytes and white count were within normal limit. His urine toxicology was negative and initial troponin was 6.59 ng/ml. Anticoagulation was initiated, and emergent cardiac catheterization revealed normal coronary arteries. Follow-up echocardiogram revealed normal cardiac function with no wall motion abnormalities. Troponin peaked at 51.57 ng/ml before trending down. Serology for adenovirus, coxsackie, cytomegalovirus and influenza were negative. Autoimmune work-up was negative as well. Cardiac MRI was performed and demonstrated Increased abnormal T2 weighted signal with delayed gadolinium epicardial and mid-myocardial enhancement in the basal to mid-lateral and infero-lateral walls, consistent with acute myocarditis. Patient remained hemodynamically stable throughout the course and was discharged home on Lisinopril and metoprolol.

DISCUSSION: Myocarditis is myocardial inflammation with necrosis of the myocytes in the absence of ischemia or infarction. Most commonly results as a sequelae of infectious etiology, especially viruses. Non-infectious causes include autoimmune diseases, hypersensitivity and toxic reaction to medications, radiation, trauma etc. It can present as chest pain and can progress to result in malignant arrhythmias, acute congestive heart failure and cardiogenic shock. Serum concentrations of troponin I and T are elevated more frequently than creatine kinase myocardial band fraction, and higher levels of troponin T has prognostic value, less in focal compared to diffuse involvement. ECG findings may vary from non-specific ST-segment and T-wave changes to ST-segment elevation mimicking acute myocardial infarction. Cardiac magnetic resonance imaging besides being non-invasive has evolved as a valuable tool for diagnosis of myocarditis. The management includes close hemodynamic and ECG monitoring and initiation of prophylactic low dose of beta blockers. Malignant arrhythmias and cardiogenic shock may necessitate anti-arrhythmic therapy and/or circulatory hemodynamic support therapies.

*INNOVATIONS IN MEDICAL EDUCATION (IME)

"AIDET SMILE": A DIDACTIC AND EXPERIENTIAL CURRICULUM ALIGNING MEDICAL STUDENTS' PATIENT-CENTERED COMMUNICATION TRAINING WITH A MEDICAL CENTER-WIDE INITIATIVE Talia R. Kahn; Diane Sliwka; Cindy Lai. UCSF, San Francisco, CA. (Tracking ID #2190375)

NEEDS AND OBJECTIVES: Patient-centered communication positively impacts patient outcomes. To improve provider communication skills with patients, our medical center adopted the "AIDET SMiLe" (Acknowledge, Introduce, Duration, Explanation, Thank You, Sit Down, Manage Up, Listen) framework for provider-patient communication. Video training for "AIDET SMiLe" is required for attendings, residents, and staff. However, there is no formal communication training for third-year medical students despite their daily care of patients as part of a medical team. To align students' communication training with this medical center-wide initiative, we developed a clerkship curriculum to teach medical students to employ the same communication skills.

SETTING AND PARTICIPANTS: Third-year medical students on their medicine clerkship at a large, urban, academic medical center participated in this curricular pilot.

DESCRIPTION: We developed a didactic and experiential curriculum for third-year students on their medicine clerkship. This pilot was designed with the "flipped classroom" model in mind (pre-recorded lectures are viewed at home followed by in-class discussion) and consisted of three components: (1) Training Video, developed to introduce the components of "AIDET SMiLe," which students completed prior to the workshop; (2) Workshop, an interactive discussion of examples of good and bad communication that students had witnessed on wards and review of "AIDET SMiLe" and data supporting this framework; (3) Peer-to-peer observation and feedback, with pairs of students observing

each other in patient encounters at the bedside and providing oral and written feedback using a structured template.

EVALUATION: Three blocks ($n=35$ students) have completed the pilot. Using a 1 (poor) to 5 (excellent) point Likert scale evaluating the components of the curriculum, the majority ($>75\%$) of students thought the overall educational value of the program was "very good" or "excellent" (average 3.94). Based on open-ended comments, the aspect of the curriculum that students found most helpful was evenly split between the training video, the workshop, and the peer-to-peer observation. Additionally, students commented that they appreciated having their patient-centered communication curriculum aligned with the medical center's initiative.

DISCUSSION / REFLECTION / LESSONS LEARNED: Prior to this pilot, there was no formal communication training for third-year medical students despite their daily care of patients. We developed a three-pronged communication curriculum for third-year medical students on their medicine clerkship that was aligned with a medical center-wide initiative. Students' responses were evenly split when asked to identify the curricular component they found most useful, suggesting that the curriculum was able to meet the needs of a wide variety of learners. Additionally, students appreciated that their patient-centered communication curriculum taught them to approach bedside patient encounters using the same model as their supervising physicians and staff.

A BLAST FROM THE PAST: RESIDENT AND FACULTY ATTITUDES WITH RE-INSTITUTION OF 24+4-HOUR CALL AT ONE MEDICAL CENTER Joel C. Boggan^{1,2}; Vaishali A. Patel¹; Aimee K. Zaas¹. ¹Duke University Health System, Durham, NC; ²Durham Veterans Affairs Medical Center, Durham, NC. (Tracking ID #2192157)

NEEDS AND OBJECTIVES: To comply with duty hour regulations, many programs have switched from overnight (ON) call inpatient coverage systems to night float (NF) team structures. This study investigates attitudes after reinstitution of ON systems at a single academic medical center.

SETTING AND PARTICIPANTS: Residents and attendings on inpatient general medicine services at Durham Veterans Affairs Medical Center, beginning April 2014.

DESCRIPTION: Rotations were changed from a NF (daily admissions, including 'rollovers', and occasional 'long' shifts of 16 h with night float coverage) to an ON (24+4-h call every fourth night for upper-level residents) system. Interns continued to do 12-h day shifts, with one week of night shifts per rotation (Table 1). Because of intern staffing, the ON system resulted in resident-only teams during the day when the paired intern was on the week of night shifts.

EVALUATION: We tracked team census, admission flow, and inpatient length of stay for 8 weeks pre-intervention and 18 weeks post-intervention. We anonymously surveyed interns, residents, and attendings using Likert scales regarding schedule changes, patient knowledge, daily census, education, and workload. Duty hour violations were tracked, in aggregate, from our reporting system. Student t-testing for team censuses and admissions, χ^2 and nonparametric testing of trends for survey responses, and Kruskal-Wallis testing for length of stay differences were performed.

DISCUSSION / REFLECTION / LESSONS LEARNED: The resident general medicine capacity increased by 14 patients, while the total daily resident admission capacity decreased from 24 patients to 18 patients (Table 1). Mean team census decreased from 9.3 \pm 1.7 patients pre-intervention to 6.6 \pm 2.2 post-intervention ($p<0.01$). While patients were perceived by trainees to be discharged more quickly post-intervention, there was no statistically significant reduction in length of stay (4.9 days pre-intervention vs. 4.4 days post-intervention, difference in means 0.5 days, $p=0.16$). Mean reported weekly hours and monthly violations were similar (71.2 h and 34.6 violations pre-intervention vs. 73.9 h and 29.2 violations post-intervention). Fifty-four trainees (84 %) and 11 attendings (61 %) responded to surveys. Trainees were in favor of keeping the ON system (48.1 % in favor vs. 24.1 % opposed), although they were significantly more likely than faculty to oppose this change (0.0 % of faculty opposed, $p=0.03$). The majority of interns (72.7 %) who worked in both systems reported a more favorable experience with ON, while residents were divided (44.8 % more favorable, 34.5 % less). Most trainees (74.5 %) endorsed better patient knowledge post-intervention. Self-reported quality of learning either improved (50.0 %) or did not change (33.3 %). Upper-level residents (62.0 %) and faculty (0.0 %) differed significantly about whether resident-only weeks were 'unmanageable' ($p<0.01$). Structure changes to ON call at a single center allowed for improved resident-patient continuity, patient knowledge, and reduced average team census without worsening reported duty hours or increasing duty hour violations. Changes based on resident feedback have included lower resident-only team and admission caps. Longitudinal study of ON systems will provide better information about educational quality and patient-centered outcomes.

A HIGH YIELD, MULTI-DISCIPLINARY PRIMARY CARE ELECTIVE FOR RESIDENTS Nancy A. LaVine⁵; Lauren Block²; Jennifer Verbsky¹; Frank Cacace¹; Saima Chaudhry⁶; Joseph Conigliaro³. ¹Hofstra North Shore LIJ, Great Neck, NY; ²Johns Hopkins University School of Medicine, Baltimore, MD; ³North Shore LIJ Health System, New Hyde Park, NY; ⁴North Shore LIJ Health System, Great Neck, NY; ⁵North Shore/LIJ, New Hyde Park, NY; ⁶nslij, Manhasset, NY. (Tracking ID #2189797)

NEEDS AND OBJECTIVES: Residents in categorical internal medicine are choosing careers in primary care at ever decreasing rates. Standard residency continuity clinic experiences can give residents a limited view of the scope of primary care practice and can have a negative influence on resident attitudes toward primary care. Primary care residency tracks are one way to provide residents with a more comprehensive experience in primary care. However, even residents in these dedicated tracks are reported to choose a primary care career less than half of the time. At our institution, the primary care track was dissolved for funding reasons several years ago. Our goal was to create a high yield primary care experience for interested residents. We developed an enhanced two week elective for second and third year residents that incorporated an additional exposure to primary care practice during residency training, increased direct mentorship by GIM faculty, expanded exposure to the multi-disciplinary nature of primary care practice in providing patient centered care, and offered instruction on high yield ambulatory practice skills.

SETTING AND PARTICIPANTS: Second and third year residents interested in primary care at the North Shore/LIJ Internal Medicine Residency program. The elective was directed by General Internal Medicine faculty with significant input from a multi-disciplinary team members (PharmD, nutritionists, certified diabetes educators, health coaches, nursing staff and reimbursement/billing staff) already working in ambulatory GIM practices across the institution.

DESCRIPTION: A pilot version of this elective was offered during the 2013–2014 academic year, and based on feedback from participating faculty and residents the curriculum was expanded for the current academic year. The two week elective encompasses experiences from a number of areas of general internal medicine. Residents performed acute care visits in a private practice setting. They gained experience teaching interns together with preceptors and educating medical students on physical diagnosis and communication skills. Residents had sessions on quality improvement in the ambulatory setting and incorporating evidence based medicine at the point of care. They participated in managing transitions of care in high risk patients in the patient centered medical home. Primary care skill building was also emphasized in the areas of anticoagulation management, nutritional counseling, medication management, immunization administration, alcohol and drug screening and diabetes education. Residents were also given time in high yield subspecialties: preventative cardiology and dermatology. Time was dedicated to curriculum vitae development and discussion of career planning.

EVALUATION: For the 2014–2015 academic year, nine residents will participate in primary care elective, including 8 third year residents, 5 women, 5 from our hospital based resident clinic, and 4 from our combined resident/faculty clinic. To date, 7 of the 9 have completed their rotation, and all five are actively seeking primary care positions. Participating residents are being surveyed on satisfaction with overall training, the learning environment, and preceptors/faculty, with particular attention to preparation for clinical practice and impact on their GIM career plans. Resident survey data on the primary care elective will be shared.

DISCUSSION / REFLECTION / LESSONS LEARNED: Standard resident ambulatory experiences can have a negative impact on resident's attitudes towards primary care careers, and we seek to change this trajectory. We initiated an enhanced primary care experience for our residents, incorporating additional primary care experiences, multi-disciplinary team exposure, mentorship and primary care skill building. By utilizing the skills and resources of current GIM faculty and multi-disciplinary team members, we created a high yield two week elective without the need for additional funding or staff. Through this elective, we hope to sustain and solidify our residents' interest in primary care and provide them with the skills necessary for excellence in clinical practice.

ENHANCING LEARNING AND TEACHING OF RESIDENTS ON NIGHT-FLOAT ROTATIONS: CREATING A STANDARDIZED FEEDBACK TOOL Tyler Anstett²; Matthew Hoegh²; Read Pierce³; Darlene Tad-y¹. ¹University of Colorado Denver School of Medicine, Aurora, CO; ²University of Colorado SOM, Denver, CO; ³University of Colorado, Denver, Aurora, CO. (Tracking ID #2196333)

NEEDS AND OBJECTIVES: In response to the 2011 ACGME duty-hour restrictions, an increased amount of work has shifted to night float systems. This has led to an increase in patient care transitions in which admitting residents do not discuss the case with attending physicians. At the University of Colorado Hospital (UCH), patients admitted between the hours of 4:00 pm and 7:00 am are admitted by residents who don't interact

with the attending physician for the primary daytime team. As a result, night-float residents often work in isolation without receiving feedback on clinical decisions. Feedback, both instructive and formative, is a central tenant of post-graduate medical education. The goal of this program was to design a system for daytime attending physicians to provide feedback to night residents without direct contact. Objectives included creating a feedback tool that was formative, informational, and efficient. Ultimately, we hoped to improve the educational value of night float rotations and provide an avenue for attending hospitalists on teaching services to reach a broader scope of learners.

SETTING AND PARTICIPANTS: Internal Medicine residents who completed night-time inpatient admissions to the Internal Medicine service at the University of Colorado Hospital.

DESCRIPTION: Internal Medicine residents who completed nighttime admissions at UCH were surveyed on the amount of feedback received and the over-all educational value of night-float rotations. Simultaneously, a tool was designed to provide feedback in the areas of clinical decision-making, documentation and billing, triage, and the appropriateness of diagnostic studies. The tool was provided to attending physicians caring for patients admitted by residents the previous night, completed, then returned to residents for review. Residents then provided input on the effectiveness of the feedback received. The tool was piloted on a single service and subsequently deployed to six teaching services that routinely receive admissions performed by night residents. Through consultation with attendings and residents, the tool has been improved and the distribution process modified.

EVALUATION: Prior to implementation of the feedback form, only 42 % of residents received any feedback during night-float rotations and none of the feedback was from daytime providers. To date, both attendings and residents have felt the tool is a valuable way to communicate and is minimally time-consuming - averaging just over 5 min to complete. Residents have felt that the feedback has generally been helpful, particularly when written comments are provided. Thus far, we have achieved a daytime provider feedback rate of 50 % for patients admitted to participating services.

DISCUSSION / REFLECTION / LESSONS LEARNED: A standardized tool can provide nighttime residents with much needed feedback on their performance during unsupervised periods and help to mitigate the divide created by night float rotations and cold-handoffs. Continued evaluation and adaptation will be needed to engrain the program into routine and provide formative and tangible feedback to more residents. With work-hour restrictions creating more situations for shift-based care, innovations such as a structured feedback tool are needed in order to continue to provide high-value education to residents.

PEER REVIEW IN GRADUATE MEDICAL EDUCATION: A NOVEL MEANS OF RESIDENT ENGAGEMENT IN SYSTEM IMPROVEMENT Laura P. Perry²; Rachel E. Chan Seay¹; Juliet Lee³. ¹The George Washington University, Washington, DC; ²Washington DC Veterans Affairs Medical Center, Washington, DC; ³George Washington University School of Medicine and Health Sciences, Washington, DC. (Tracking ID #2200330)

NEEDS AND OBJECTIVES: Resident physicians are in an optimal position to identify operational problems within academic teaching hospitals. Yet many academic hospitals have reported struggles to develop and maintain housestaff engagement in quality improvement efforts. We propose an alternate model for resident involvement in operational change on an institutional level: a resident peer review committee. The process of peer review engages residents in critical appraisal of their co-residents' activities, and allows for thoughtful reflection on each participant's own practices. Additionally, review of cases with poor outcomes allows residents to identify system-level problems. Peer review thus helps residents experience the benefits of root cause analysis-style quality improvement while also helping to develop a deeper sense of professionalism.

SETTING AND PARTICIPANTS: The Resident Peer Review Committee is a resident physician advocacy group that was created at The School of Medicine and Health Sciences at The George Washington University (GWU SMHS).

DESCRIPTION: The Committee is composed of residents from all specialties that train at GWU SMHS. Its purpose is to review cases involving resident physicians relating to professionalism, communication, safety and supervision. In its early stages, the Committee received few case referrals. The members nevertheless found the meetings to be an opportunity to discuss common problems encountered in the hospital setting. Residents began to share and analyze their experiences of hospital administration and logistics, and ultimately decided to formally address some of the common problems by producing Committee Opinions. These reports were disseminated to the hospital leadership and residency program directors, and resulted in a variety of initiatives to improve patient care. As the Committee grew more visible, residents and faculty began to refer cases more frequently. The Committee generally found that cases with poor outcomes usually resulted from a combination of individual error and systems-level problems. The identification of

these large-scale problems during reviews naturally led to the production of more Opinions.

EVALUATION: The Committee has engaged in constant reflection and self-reinvention throughout its lifespan, taking shape to accommodate the needs of the housestaff in general and its members. Challenges during the early phases included member recruitment and resistance by hospital stakeholders. Early experiences led to a practice of constant communication with a wide range of stakeholders, including resident-to-resident outreach for recruitment, and back-and-forth with hospital and faculty stakeholders in the dissemination of Opinions. In its second year, the Committee struggled to maintain member participation and engagement, ultimately voting to approve a set of member expectations that would more evenly distribute work. As additional residents were recruited, the workload could be distributed among a larger number of committee members. The general housestaff body also remained skeptical of the Committee's effectiveness at its inception, with misperceptions including that the Committee was a disciplinary board. As a remedy, a Resident Town Hall was held to update the entire housestaff body on the Committee's activities, and to encourage correspondence with the Committee when residents had concerns. The feedback received from this Town Hall was overwhelmingly positive, and the volume of referrals continued steadily to increase. In its fourth year of existence, the Committee has become the predominant voice for resident representation at GWU SMHS, establishing credibility and building relationships.

DISCUSSION / REFLECTION / LESSONS LEARNED: If teaching institutions are dedicated to educating mature, responsible and professional physicians, they must accept a full range of methods for dealing with issues of professionalism and self-assessment, including peer review. Additionally, teaching institutions that seriously address the problem of resident burnout will find that residents want to feel that their voice is valued, that they are protected from retribution, and that they can impact change. We present our experience with resident peer review as a novel model that other programs may consider in the effort to increase resident engagement.

STUDENT AS TEACHER: A STUDENT INITIATED, LEARNER CENTERED, FOURTH YEAR MEDICAL SCHOOL EDUCATION ELECTIVE Martin C. Fried²; Dr. Sarah Milburn³; Sheira Schlair¹. ¹Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY; ²NYU, Astoria, NY; ³Mount Sinai, New York, NY. (Tracking ID #2190322)

NEEDS AND OBJECTIVES: Medical school graduates are expected to teach immediately as interns. Few US medical schools offer structured teaching for senior students motivated to develop teaching skills. Two fourth year medical students (MF, SM) created a learner centered, 4-week MS-4 elective entitled "Student-as-Teacher" (SAT). This elective aimed to develop teaching skills by increasing knowledge about teaching and applying that knowledge in various educational settings for MS-1 students. Ultimately we hoped this project would garner interest in establishing a permanent teaching elective at our medical school.

SETTING AND PARTICIPANTS: This pilot elective was designed by two fourth year medical students at Albert Einstein College of Medicine (AECOM) who had K-12 teaching experience prior to medical school. They also participated in the elective, enlisting first-year medical students as student-learners whenever possible. Course directors included a basic science course director who directs an elective for PhD students about course design and an internal medicine core clinical faculty member who leads the resident-as-teacher program at our hospital (SS). They supervised elective development and delivered didactic sessions.

DESCRIPTION: The SAT elective curriculum was designed to approximate 3 ascending levels of Bloom's taxonomy from building mastery of basic knowledge of teaching skills and advancing to application and evaluation. In component 1, student-teachers (STs) engaged in a learner-centered didactic curriculum with interactive sessions covering topics like adult learning theory principles and Socratic method in clinical teaching and precepting. In component 2, STs applied acquired knowledge by leading two sessions for MS-1 students: a small-group case conference on lipid transport and large-group lecture on EKG fundamentals with formal learner feedback. In component 3, STs were tasked to synthesize their teaching experience by working with a faculty preceptor to evaluate and enhance an element of the undergraduate medical school curriculum. For this project the STs chose to revamp a case conference in the disease mechanisms course by realigning conference objectives with course learning objectives and changing the format to increase student engagement.

EVALUATION: STs were evaluated by student-learners in the application component activities via post-session online and in-person surveys. Overall comments were quite positive: 96 % of MS-1 students felt more comfortable interpreting EKGs after the EKG lecture and 78.2 % felt that the lecture encouraged self-directed learning. Qualitative feedback from case conference included, "... loved the interactive element" and "Very engaging and helpful in eliciting our responses". After participating in the elective STs

created 'teaching philosophy' reflections. STs felt better prepared to execute learning activities in varied settings. Unanticipated benefits included the opportunity to improve academic writing and engage with faculty and administration in novel ways like collaborating on curricular innovations. Opportunities for formal teaching observation of STs by faculty observers were sparse in the pilot elective. Later iterations will therefore aim to include more robust observation and feedback opportunities by experienced medical school teachers. Implementation of a formal medical education elective at AECOM was ultimately approved by the Clinical Directors Subcommittee. Long-term goals include the creation of a Medical Education scholarship track for students.

DISCUSSION / REFLECTION / LESSONS LEARNED: In designing the elective we discovered that much of the framework for a formal SAT elective at AECOM and affiliate teaching hospitals exists within courses currently offered to students, faculty and residents. As such, few novel educational activities were required to achieve our goals. Other institutions seeking to incorporate similar "student-as-teacher" programs may also be pleasantly surprised to find great resources available for student-teacher training. The importance of working within the established curriculum while creating new academic content was a paramount lesson that STs learned. Innovation in medical education curriculum, especially student-driven innovation, should augment and not necessarily replace existing resources. ST choice and flexibility was an important theme in our elective design. We believe that STs should have the ability to craft learning experiences that would complement their own skills and career ambitions. We found that SAT electives have the potential to not only provide basic teaching skills to medical students interested in teaching. By offering the opportunity for fourth-year medical students to act as teachers to their peers in structured environments such courses can augment the desire to pursue careers in medical education and have lasting effects that extend into residency and beyond.

A NOVEL, WEB-BASED, ASYNCHRONOUS AND INCREASINGLY INTERACTIVE COURSE TO MEET THE NEEDS OF FOURTH YEAR MEDICAL STUDENTS Thomas D. Shiffler; David Feldstein; Yuyen Chang. University of Wisconsin School of Medicine and Public Health, Madison, WI. (Tracking ID #2193981)

NEEDS AND OBJECTIVES: Students in their fourth year of medical school face increasing off-campus demands including residency interviews and away rotations. Courses that allow students to meet these demands would be useful. Clinical Therapeutics, a fourth year elective, prepares students to treat common conditions and diseases that they will encounter during residency. We adapted this elective to: 1) provide an asynchronous and completely online course that allows maximum flexibility to meet students' geographic and schedule needs; and 2) integrate new methods of interactive online learning.

SETTING AND PARTICIPANTS: The course was first modified to be entirely online in 2012. All fourth year medical students at the University of Wisconsin School of Medicine and Public Health (UWSPH) are eligible to take the elective and can sign up for 2-4 credits.

DESCRIPTION: Clinical Therapeutics is entirely online and focuses on diseases, conditions or content that will be important to students during their residency and beyond. More than 70 topics are included, covering a wide range of issues such as depression, hyperlipidemia, cost of care, and team-based care. Various methods are used to deliver the content. Most topics are recorded lectures that can be viewed online when convenient. After viewing the lecture, the student demonstrates learning by developing a boards-type question and answer based on one of the lecture's main points. The second content delivery method uses Case Scenario Builder (CSB), a novel, interactive tool developed at the University of Wisconsin-Madison. CSB allows faculty to create interactive questions and case scenarios that require students to be more active learners. They must answer questions correctly before continuing and eventually completing each scenario. While CSB is more interactive than recorded lectures, it also takes substantially more faculty time to develop. The final method of content delivery involves web-conferencing. Each web-conference is based on a recorded lecture, which students view in advance. A faculty member then leads students through multiple cases during the web-conference. Students can be virtually placed in breakout groups to collaborate on questions with colleagues.

EVALUATION: In 2011, the last year the course was offered in a classroom setting, 10 students enrolled (7 % of the graduating class). In 2012 the course was converted to be entirely online and 52 fourth year students enrolled (35 % of the graduating class). Enrollment increased to 107 students (64 % of the graduating class) in 2014. End-of-course evaluations from 2014 showed that: 93 % (96/103) of students agreed or strongly agreed that the course was excellent; 90 % (95/106) agreed that the web conferences were valuable for learning the content; and 96 % (101/105) felt the CSB sessions were a valuable learning experience. One student noted, "Case scenarios were great—allowed me to answer questions during the lecture which allowed me to digest the material." We found that 69 % (65/94) of students preferred the interactive case scenarios to recorded lectures. Another student commented, "Make more of them (case scenarios). Walking us through how to approach a case in an interactive format is probably the best way for us to learn. Lectures don't stick for very long."

DISCUSSION / REFLECTION / LESSONS LEARNED: A web-based, predominantly asynchronous course was very well received by students and led to a dramatic increase in student enrollment. The course clearly fit a need for fourth year students by providing increased schedule and geographic flexibility. Further online and asynchronous elective options for students should be explored. While students prefer the interactive nature of the CSB, additional faculty time is required to develop the sessions. Evaluating whether CSB sessions actually improve student learning compared to recorded lectures is critical to determine whether this additional faculty time is worthwhile. We have continued to expand the number of CSB sessions and plan to perform a randomized controlled trial to look at the benefits of CSB versus recorded lectures. We will also continue to explore other methods of content delivery to provide students with the best learning experience.

A RANDOMIZED TRIAL OF AN INTERVENTION TO IMPROVE RESIDENT-FELLOW TEACHING INTERACTIONS ON THE WARDS Shruti Gupta²; Kevin Heaton²; Jehan Alladina²; Alberto Puig¹; Eli Miloslavsky². ¹MGH/Harvard Med School, Boston, MA; ²Massachusetts General Hospital, Department of Internal Medicine, Boston, MA. (Tracking ID #2196445)

NEEDS AND OBJECTIVES: Clinical fellows can serve as a tremendous educational resource to residents. However, multiple barriers to an effective resident-fellow teaching interaction in the setting of inpatient consultation exist. We designed a resident-directed intervention to address some of the known barriers and conducted a randomized study of the intervention with the goal of improving the initial consult request and subsequent teaching interactions between Internal Medicine (IM) residents and fellows.

SETTING AND PARTICIPANTS: Five medical teams consisting of 5 interns and 1 or 2 supervising residents were randomized to receive the intervention (2 intervention, 3 control) over a period of 3 months.

DESCRIPTION: The intervention consisted of four tasks that interns were asked to complete for every new consult to an IM subspecialty service: • Intern and supervising resident determine a specific consult question • Intern asks to have an in-person interaction with the fellow after the fellow has seen the patient • Intern encouraged to initiate the teaching interaction and elicit at least one teaching point • Intern shares the teaching point on rounds with the team. The intervention was evaluated with pre and post-intervention surveys measuring communication and teaching between interns and subspecialty IM fellows on all teams.

EVALUATION: Results: A total of 112 interns participated in the study. Sixty nine interns completed the pre-intervention survey and 64 (57 %) completed the post-intervention survey. The pre-intervention survey demonstrated that among new patient consults, 82 % of interns had in-person interactions with fellows less 50 % of the time, 81 % stated they received teaching in less than 50 % of consult interactions and 58 % of interns felt that they received "pushback" from fellows during 15–50 % of their consult requests. Forty nine percent of interns felt that they initiated the teaching interaction more than 50 % of the time. No baseline differences were noted between the intervention and control groups. Following the intervention, interns in the intervention group more frequently reported receiving teaching in 50 % or more of their interactions compared to those in the control group (40 vs. 16 %, $p=0.047$). In addition, interns on the intervention team reported a trend toward more frequent in-person interactions with fellows (28 % vs. 9 % having in-person interactions more than 50 % of the time, $p=0.087$). There were no differences in the overall level of communication between the primary team and fellows, overall teaching or the amount of perceived "pushback" from fellows as a result of the intervention. Seventy two percent of interns reported that they were able to implement the intervention "some" or "most of the time."

DISCUSSION / REFLECTION / LESSONS LEARNED: Conclusions: IM interns at our institution perceive that teaching interactions with fellows occur in less than half of consult interactions and "pushback" occurs in a considerable share of consult requests. A time-efficient, resident-directed intervention demonstrated some improvement in resident-fellow teaching interactions, though was limited by incomplete adherence. Further efforts to improve the resident-fellow teaching interaction, including further studies of this (or similar) intervention, are warranted.

A REAL-WORLD STRATEGIC NEEDS ASSESSMENT THAT ENGAGES HOUSE STAFF OUTSIDE THE CLINIC TOWARD COMMUNITY HEALTH David M. Levine; Colleen Vessell; Matthew R. Augustine; Kathleen Hanley. New York University School of Medicine, New York, NY. (Tracking ID #2196293)

NEEDS AND OBJECTIVES: While house staff work daily in the clinic and hospital to achieve health for their individual patients, they often feel uninformed and unable to effect change in their patients' surrounding community. Through action outside of the clinic, they may be able to impact their community's health. Yet few strategies exist for house staff to practice community health. Strategically assessing the needs of a community is

often considered difficult and time-consuming but is paramount to correctly identifying impactful interventions. While zip code-level data often suggests significant health needs within the larger community, these data are often not sufficiently granular to identify the needs of a clinic's specific population. Our objectives: 1) provide residents the opportunity to perform a feasible needs assessment of their clinic population; 2) describe the social and medical needs of our community clinic's patients; and 3) distill the community needs assessment data into actionable projects feasible for our entire medical team and its community. Here we present an ongoing resident-engaged, clinic-involved, patient-centered needs assessment that requires a relatively small resource base yet yields a substantial data set for planning real-world community-based interventions that engages house staff toward action outside the traditional clinic.

SETTING AND PARTICIPANTS: We practice in a densely populated urban area with large unmet medical and social needs. Our clinic is community-based, publicly supported, and provides primary care services on a sliding scale fee schedule to almost exclusively Medicaid and uninsured patients. Internal medicine—primary care house staff, medical assistants, and pre-medical undergraduate students devised and delivered a survey, along with input from patients. Patients could be surveyed if they were orally proficient in English, Mandarin, or Spanish and presented to our clinic for an appointment. They were excluded if they had a condition that precluded oral conversation (e.g. severe dementia, psychosis, deafness).

DESCRIPTION: House staff developed a brief survey utilizing validated questions from national surveys as well as home-grown questions relating specifically to our practice environment and changes that could be made in our community and clinic. The survey was refined with feedback from our medical assistants (most of whom live in our patients' neighborhood), clinic administration, and small sample of patients. Volunteer undergraduates fluent in Chinese and Spanish administered the survey to a convenience sample of patients while they awaited their appointment.

EVALUATION: We analyzed survey data via descriptive statistics and cross-tabulation. English- and Spanish-speaker data analysis ($n=168$) is complete, while Mandarin-speaker data collection is ongoing. Already clear trends in our community are present: poor health literacy, food insecurity, and few exercise opportunities. Clear areas for action are also evident: over 50 % would be interested in volunteering as a health coach, a specific demographic segment is in need of health insurance counseling, and about a third of patients would participate in exercise classes if offered at our clinic. Additionally, the majority of our patients have internet access and use email, often via mobile devices. Project planning is ongoing.

DISCUSSION / REFLECTION / LESSONS LEARNED: A brief evidence- and community-based survey can identify key flex points where community- and clinic-centered interventions will address the community's expressed needs. Involving our entire medical team (patients, medical assistants, house staff, and administration) enormously benefited and focused our survey. Support from volunteer undergraduates was at times difficult to solicit, but their inclusion was certainly a strength. For the design and execution of our community-based intervention, we anticipate a similarly inclusive process. Thus far our needs assessment has uncovered important areas where house staff can be engaged in further health-related work outside the walls of the clinic and hospital with members of their medical team.

A RESIDENT WORKSHOP ON GIVING PERFORMANCE FEEDBACK TO PROBLEMATIC MEDICAL STUDENTS Gita Mehta¹; Neil J. Farber³; Simerjot K. Jassal²; Peggy Wallace¹; Robert MacAulay¹. ¹UCSD, La Jolla, CA; ²UCSD/VASDHHS, San Diego, CO; ³University of California, San Diego, La Jolla, CA. (Tracking ID #2199630)

NEEDS AND OBJECTIVES: Learning to give performance feedback is critical to Competency training for residents. Residency in Medicine usually does not provide adequate training for providing meaningful feedback to difficult learners, which is essential for ensuring clinical competence in medical students. We developed a workshop for evaluating and training resident' in handling difficult clinician -student interactions, and then assessed their confidence in giving meaningful feedback.

SETTING AND PARTICIPANTS: We trained fourth year medical students to represent difficult learners (Standardized learners), and medical residents were required to provide feedback to the students. Twenty four medical residents participated in a structured feedback sessions that involved communication with 4 medical students. Residents were asked to give performance feedback to students representing the disorganized, disinterested, know-it-all and the knowledge deficit student. Residents moved in pairs from one student to the next, assigned as participant or observer, while faculty were assigned to a specific student. Faculty members were able to view each interaction remotely in a monitoring room, before joining the student and residents to debrief on each encounter and provide feedback.

DESCRIPTION: Twenty-four R1-R3 residents participated in 2 separate sessions. Prior to the session faculty and residents were provided pertinent reading materials and a tutorial

on giving feedback. Residents were given 15 min to communicate with each student. Following each encounter, 15 min were spent in giving feedback to each resident by the colleague, medical student and observing faculty member.

EVALUATION: Residents indicated infrequent experience in dealing with problematic medical students; few residents felt they had significant teaching experience with a know-it-all learner (1/24), disorganized (6/24), disinterested (2/24), and the knowledge deficit student (3/24). Before this workshop, only 15/24 residents reported ever being directly observed and given feedback in delivering performance feedback to learners.

DISCUSSION / REFLECTION / LESSONS LEARNED: All residents felt the workshop allowed them to reflect on their ability to provide quality performance feedback in "difficult learner" situations and gained ideas to implement in the future. 23/24 residents felt the workshop helped remove the fear and uncertainty of the performance feedback process. All residents felt it enabled them to practice performance feedback skills in a supportive and instructional setting. Our workshop supports the use of a structured feedback session to train medical residents to provide feedback to medical students. This setting permits immediate feedback to the resident from the medical student, peers and faculty members. Despite the inherent constraints of simulated encounters, this workshop provides a safe environment for residents to learn key skills relevant to competency training.

A SAFE AND EFFECTIVE DISCHARGE CURRICULUM IMPLEMENTED IN ELEVEN INTERNAL MEDICINE PROGRAMS OF THE EDUCATIONAL RESEARCH OUTCOMES COLLABORATIVE Lauren B. Meade¹; Kathleen A. Heist³; Ron Jones⁴; Cheryl O'Malley²; Kenji Yamazaki⁶; Aimee K. Zaas². ¹Baystate Medical Center, Springfield, MA; ²Duke University, Durham, NC; ³University of Colorado at Denver, Aurora, CO; ⁴Summa Health Systems, Akron, OH; ⁵Banner Good Samaritan, Phoenix, AZ; ⁶ACGME, Chicago, IL. (*Tracking ID #2197746*)

NEEDS AND OBJECTIVES: The transition from hospital to home is a vulnerable time for patients and families and is ripe for physician training. We implemented a discharge curriculum focusing on the competence of a 'Safe and Effective Discharge (SAFE-D) From the Hospital'. The primary objective for the SAFE-D innovation was to assess the usefulness of determining competence using direct observation and feedback. Our secondary objectives include: 1. To increase attending and resident awareness of 6 physician behaviors for a SAFE-D 2. To increase the quality of feedback from attendings when they observe residents in the SAFE-D behaviors 3. To assess the usefulness of multi-source feedback on the determination of resident competence and 4. To assess the feasibility of using behavior-based direct observation in assessment for SAFE-D. We will also assess the effect of a Collaborative process in implementation across programs.

SETTING AND PARTICIPANTS: Eleven Internal Medicine (IM) programs of the Educational Research Outcomes Collaborative (Collaborative) participated in the SAFE-D innovation including 251 attendings and 299 Post Graduate Year 1 residents. The discharge innovation was required for all attendings and residents on the wards as part of the educational requirements of the wards rotation. Faculty and residents were oriented to the discharge curriculum in a 1 h interactive session by the site principle investigator (PI). Site PIs from all the programs collaborated on monthly conference calls to implement the discharge curriculum by sharing barriers and successes throughout the year.

DESCRIPTION: From September 2013 to June 2014, 11 IM programs implemented a workplace direct observation discharge curriculum. The discharge curriculum consists of serial direct observations in the following domains: Medication Reconciliation, Discharge Summary, Patient Communication, Anticipates Post Hospital Needs, Actively Collaborates, and Team Communication. Attendings observed these domains during their usual work on the wards with the resident. Attendings rated the resident on a competence 5 point scale from 'resident cannot perform even with assistance' to 'resident can act as an instructor on this skill'. Attendings gave corrective feedback until the resident had reached a level of competence defined by being 'ready for indirect supervision'. At the completion of one year discharge curriculum, attendings and residents completed a voluntary survey to assess the objectives of the discharge curriculum.

EVALUATION: One hundred and nineteen attendings and 181 residents completed a post innovation survey. Sixty percent of attendings and 51 % of residents agreed that the curriculum made them more aware of discharge behaviors. Fifty-three percent attendings agreed that they increased their direct observation using the curriculum. Sixty-seven percent attendings and 57 % of residents agreed that the curriculum provided a structure for giving feedback. Fifty-one percent of attendings and 76 % of residents agreed that they are more confident in assessing how well the resident engages with other health professionals. Forty-six percent of attendings and 57 % of residents agreed the curriculum was easy to use on the wards. Seventy-nine percent of attendings agreed that this curriculum was more effective than their prior practice of teaching the discharge. Sixty-five percent of attendings agreed that they were more confident in assessing resident competence using

the discharge curriculum. Sixty-four percent of residents agreed that the curriculum helped them understand the requirements to progress toward increased independence.

DISCUSSION / REFLECTION / LESSONS LEARNED: The SAFE-D curriculum improved attending and resident awareness of discharge behaviors, increased attending direct observation and increased feedback. Applying the educational method of direct observation and feedback for the purpose of advancing the resident by competence was shown to be both useful to the attending and the resident. In addition, this educational innovation is unique in that multiple programs developed and implemented a standardized curriculum across programs using a collaborative model. The Collaborative was established in 2008 by members of Alliance for Academic Internal Medicine to share educational innovations and study their outcomes. Lessons learned from the Collaborative approach to medical education innovations include: 1. The Collaborative enhanced idea generation as we had a diverse group of programs by size, region and university affiliation. 2. The work of the Collaborative energized the faculty to try new approaches to the SAFE-D curriculum and health education overall and 3. There was more buy-in from both leadership and program faculty for the educational initiatives as a member of a national Collaborative in medical education.

A SYSTEMATIC FACULTY DEVELOPMENT APPROACH FOR A NEWLY FORMED PROGRAM IN HOSPITAL MEDICINE Somnath Mookherjee; Christy McKinney; Thomas Gallagher. University of Washington, Seattle, WA. (*Tracking ID #2199353*)

NEEDS AND OBJECTIVES: Scholarly productivity and effective teaching can be challenging for academic hospitalists. Few have had training in research, project development, or teaching skills. In 2012 our institution created a Program in Hospital Medicine with the goal of supporting hospitalist academic work and raising the scholarly profile of this group of faculty. We developed a Faculty Development Program (FDP) with the broad aims of providing faculty with the skills and knowledge needed for academic success and career satisfaction. Specific goals were to create a curriculum based on systematic needs assessment (phase 1), to deliver content that was well received and attended (phase 2), and to periodically adjust the program to better meet the needs of faculty based on regular needs assessment (phase 3).

SETTING AND PARTICIPANTS: The Program in Hospital Medicine is part of the Division of General Internal Medicine and is composed of hospitalist and medicine consult faculty at two hospital sites at our University (expanded to all three hospital sites for the 2014–2015 academic year).

DESCRIPTION: Phase 1: We conducted a baseline needs assessment survey of hospitalist faculty between October 2012 and March 2013. Using a five point Likert scale where 1=low confidence, 3=neutral, 5=high confidence, faculty were queried on their confidence in skills in clinical, educational, research, and professional development domains. Phase 2: Curriculum development and deployment. We identified areas of high need using the survey results, and wrote specific learning objectives to address the needs across all four domains. We invited speakers to lead seminars to achieve the learning objectives and evaluated each seminar by surveying attendees. Phase 3: Program assessment and adjustment. In May 2014 we asked all hospitalist faculty to repeat the needs assessment survey to assess for changes in confidence.

EVALUATION: Phase 1: 27 of 40 eligible faculty (68 %) responded to the needs assessment survey. Representative areas of low confidence included "Ability to apply for grants to help fund a scholarly project" (mean±SD, 1.8±1.1), "Confidence in designing a scholarly project" (3.0±1.1), "I have a mentor that can support me in my scholarly projects" (2.9±1.3), "Confidence in publishing a manuscript reporting a scholarly project" (3.0±1.2), and "I know what I need to do to be promoted" (3.3±1.2). Phase 2: Curriculum development and deployment. Invited speakers gave 30 seminars during the 2012–2013 and 2013–2014 academic years. On average, 7.6±3.7 faculty attended each seminar. Seminars were rated highly for quality of instruction (4.8±0.5; 1=lowest possible, 3=neutral, 5=highest possible), relevance to faculty development needs (4.7±0.6), organization and format (4.7±0.5), and overall quality (4.8±0.4). Phase 3: Re-assessment and adjustment. Thirty-eight of 55 eligible faculty responded to the re-assessment survey (69 %). Although the faculty at our third hospital site were included in the survey and FDP activities, their responses were not included for comparison purposes since that group was not surveyed in 2012. Average confidence ratings for skills in clinical, educational, research, and professional development domains were compared with the baseline results: there were no significant changes. Therefore, in order to have a greater impact, the FDP was re-designed for 2014–2015. We focused on the main theme of "Excellence in teaching," with the majority of seminars centered on teaching skills. We created a structured peer observation program of bedside teaching to encourage the dissemination of faculty development out of the classroom and into the workplace. We also created a website to publicize upcoming events and archive seminar materials. In the 17 seminars to date, attendance has remained steady and ratings remain high. We will survey faculty at the end of the academic year to re-assess the program.

DISCUSSION / REFLECTION / LESSONS LEARNED: Consistent attendance and strong evaluations over 3 years support the sustainability of the program. Improved confidence in specific skills has yet to be demonstrated. We are developing more objective measures of success, such as dissemination of scholarly work and ratings of teaching efficacy.

A TRANSITIONS-OF-CARE CLINICAL ROTATION FOR INTERNAL MEDICINE RESIDENTS: CURRICULUM AND EFFECTS ON READMISSIONS OF A MILESTONES-BASED Asaad Nakhle; Rimma Polevoy; George Samuel; John Veljanovski; Vinay Shah; David E. Willens. Henry Ford Hospital, Detroit, MI. (Tracking ID #2199224)

NEEDS AND OBJECTIVES: The American College of Graduate Medical Education (ACGME) has mandated new resident evaluations based on developmental milestones. The ACGME's Clinical Learning Environment Review (CLER) has increased attention on education on transitions in care. We developed the Transition Of Care (TOC) clinic, a 1-month ambulatory resident rotation with objectives of (1) Improving resident medical knowledge and clinical care of complex patients; (2) Improving resident skills in transition of care medicine; and (3) Providing earlier hospital follow up and higher intensity ambulatory care for patients at high risk of readmission. The evaluation of residents utilizes the milestones relating to team-based care, cost-consciousness, transition from inpatient to outpatient care, and communication to ensure care continuity. In this abstract, we describe the curriculum and the results of a retrospective cohort analysis examining the effects of the TOC clinic on hospital readmission and ED utilization.

SETTING AND PARTICIPANTS: This study's setting was an urban academic internal medicine (IM) teaching clinic in Detroit, Michigan. Providers include 90 residents, 18 faculty physicians, a psychologist, a pharmacist, and two midlevel providers.

DESCRIPTION: Patients were referred by inpatient general or specialty medicine teams when providers felt the patient was at high risk of readmission due to social or medical complexity. We compared patients seen in the TOC clinic to those seen in usual care for hospital follow up. Office visits in the TOC clinic were 60 min long with a senior resident and preceptor with special interest in complex, transitional care medicine. Clinical pharmacists were available, patients were contacted with test results on the same day, and psychosocial issues were addressed with the help of behavioral health psychologists. More intense interventions, such as intravenous fluids or diuresis, nebulizer treatments, and reduction of polypharmacy were also regularly done in the TOC clinic. These resources were also available in usual care, but more time was available for their use in the TOC clinic. Usual care consisted of a standard 30 min office visit and could be with a faculty physician alone or with a supervised resident physician in the same clinic. Other teaching strategies included didactic and discussion sessions led by the faculty preceptor, and online modules on readmissions, cost-conscious care, community resources, insurance, and billing. To increase collaboration skills, residents communicated directly with patients' primary care providers, and they often cared for patients with the pharmacist and/or health psychologist. Readmission within 30 days of discharge to Henry Ford Health System was the primary clinical outcome. Multivariate analysis adjusted for confounders, including Charlson comorbidity index, patient sex, age, and time from discharge to follow up. Patients were seen between December 2013 and May 2014. Data was extracted from the electronic medical record.

EVALUATION: Each resident was evaluated by the preceptor using milestone-based online assessment, which was developed by the preceptor with assistance from a faculty physician trained in milestone-based evaluation. Resident outcome analysis is in progress. 456 patients and 1632 patients were seen in the TOC clinic and usual care clinics for hospital follow up, respectively. TOC clinic patients were significantly more likely to be readmitted within 30 days when compared to the non-TOC patients (15.1 % versus 11.3 %, $P=0.028$) and had a significantly lower mean number of days from discharge to visit (7.8 versus 10.1, $P<0.001$). However, after accounting for the other study covariates, TOC patients were not significantly more likely to be readmitted within 30 days ($P=0.205$).

DISCUSSION / REFLECTION / LESSONS LEARNED: After adjusting for comorbidities and demographics, the TOC clinic did not have a significant effect on the rates of patient readmission. Unadjusted analysis showed increased readmissions in TOC patients. These findings support prior evidence, which showed that no single intervention implemented alone was regularly associated with reduced risk for readmission. Results may underestimate readmissions, since data was limited to our single healthcare system. Qualitative feedback from the TOC preceptor and residents on the milestone-based evaluation was overall positive. The preceptor felt it was easy to map existing rotation activities to ACGME milestones for internal medicine. Residents felt the evaluation clarified the important transition of care skills. Future research on resident knowledge, skills, and attitude outcomes is in process.

ACADEMIC HOSPITALIST ATTITUDES TOWARD TEACHING HUMANISM: A WORKSHOP EVALUATION AND NEEDS ASSESSMENT Mina R. Kang¹; LuAnn Wilkerson²; Michael Soh³. ¹David Geffen School of Medicine at University of California, Los Angeles, Santa Monica, CA; ²David Geffen School of Medicine at University of California, Los Angeles, Los Angeles, CA; ³Graduate School of Education & Information Studies at University of California, Los Angeles, Los Angeles, CA. (Tracking ID #2197009)

NEEDS AND OBJECTIVES: Humanism is fundamental to excellence in patient care and is continuously emphasized by patients, professional accrediting agencies and educational councils for undergraduate and graduate medical education. However, little is known about attitudes surrounding the teaching of humanism in medicine and if, and how, it differs between faculty members that have engaged in humanism specific faculty development vs. those that have not. We attempted to shed light in this domain by assessing faculty attitudes around the practice and teaching of humanism as a means for performing a workshop evaluation as well as a faculty development needs assessment.

SETTING AND PARTICIPANTS: Seven hospitalists received a health-system-wide teaching humanism award since its conception in 2010. Awardees were nominated by colleagues and selected through a faculty peer-review process. All awardees participated in a series of workshops that focused on developing strategies for explicit teaching of humanism at the bedside. Four awardees had completed the workshop series and 2 awardees were currently enrolled in the workshop series.

DESCRIPTION: In this cross-sectional, qualitative study, we conducted semi-structured interviews of 6 hospitalist awardees (4 senior and 2 junior faculty physicians) and 11 matched controls (5 senior and 6 junior faculty hospitalists) and compared their attitudes toward the teaching of humanism. A thematic analysis was performed with second-person, outside-group validation.

EVALUATION: Three major themes were identified: teaching scope, teachability, and overcoming barriers. Significantly more awardees had a broad teaching scope (100 vs. 64 %), perceived humanism as teachable (83 vs. 45 %), and were optimistic about overcoming barriers (100 vs. 55 %) than their matched control counterparts. Subgroup analysis of the control group showed bimodal distribution with senior controls more than junior controls perceiving humanism as teachable (60 vs. 33 %) and demonstrating greater optimism about overcoming barriers (80 vs. 33 %). However, there was no difference in regards to teaching scope between senior and junior control faculty indicating that this aspect of teaching humanism was most affected by the workshop experience. Between the senior and junior awardee subgroups, teaching scope and attitudes toward barriers remained the same with the only difference being the perception of teachability (100 vs. 60 %).

DISCUSSION / REFLECTION / LESSONS LEARNED: Learning to practice and teach medicine with humanism was observed to be a developmental process. Senior control faculty developed favorable attitudes toward teaching humanism solely based on experience over time. However, this growth and maturation was not to the extent of those physicians that participated in the faculty development workshops. Awardees had a greater ability to more broadly identify teachable moments, which was not a skill gained by seniority alone. Additionally, the differences observed among the subgroups further demonstrate the spectrum that our faculty represents along a continuum of development. For example, 2 out of the 6 awardees were junior faculty that had not yet completed the humanism workshop, and the difference in attitudes between these subgroups could demonstrate a growth phase in faculty development. The "stages of change" model can be used to demonstrate the developmental process of learning to practice and teach humanism. The Teaching Humanism at the Bedside Workshop facilitates this progression more efficiently than how faculty would progress on their own with only personal experience over time. As a program evaluation, this study shows there is clear efficacy of the Teaching Humanism at the Bedside Award and Workshop to identify faculty learners open to moving up the stages of change ladder and then helping them to achieve the final stages. As a needs assessment, we learned that it would be important to identify the stage of the faculty learner in order to target learning objectives. This would entail convincing some faculty why this is worth their time—"re-branding" humanism in medicine, raising awareness and creating more opportunities for conversations about humanism, and evaluating the teaching of humanism more consistently.

ACCEPTANCE AND EFFECTIVENESS OF A TELEPHONIC NURSE-LED BASAL INSULIN TITRATION PROGRAM IN AN INTERNAL MEDICINE ACADEMIC PATIENT-CENTERED MEDICAL HOME Benjamin Swanson; Mira Samet; Daryl Sudasena; Andrew Bissonette; David E. Willens; Mona Hassan; Anupama Nair; Sean Drake. Henry Ford Hospital, Detroit, MI. (Tracking ID #2199318)

NEEDS AND OBJECTIVES: Interdisciplinary team based care is an important aspect of healthcare, but in many settings this is a shift from doctor-centered culture. As the healthcare system continues to grow in complexity and national attention focuses more

and more on healthcare costs it is increasingly important for healthcare providers to seek the most effective and efficient methods of delivering care. This requires that physicians in training have a significant exposures to avenues where interdisciplinary teams provide creative solutions to common problems. Uncertainty exists about the acceptability To improve effectiveness of diabetes care in January, 2014 a telephonic nurse-run basal insulin titration protocol was developed and implemented at our urban, academic internal medicine (IM) clinic. Our objectives were to determine the intervention acceptance by providers and patients and to assess the effectiveness on diabetes outcomes.

SETTING AND PARTICIPANTS: This study's setting was an urban academic internal medicine (IM) teaching clinic in Detroit, Michigan. Patients are cared for by 90 residents, 18 faculty physicians, a pharmacist, a health psychologist, advance practice nurse with specialization in diabetes care, and a physician assistant. A registered nurse trained in motivational interviewing and diabetes care carried out the intervention.

DESCRIPTION: Patients were referred to the telephonic nurse diabetes protocol by IM residents or faculty if they were recently diagnosed with diabetes, newly started on insulin, or had poorly controlled blood glucose by hemoglobin A1c (HbA1c) or home glucose monitoring. The registered nurse contacted patients by phone approximately weekly to address diabetes education, barriers to change, and fasting blood glucose (FBG) levels. All patients were on basal insulin (glargine or detemir), which was titrated per protocol until age-specific targeted FBG (<70 years: 80–120 mg/dl; ≥70 years: 100–120 mg/dl) was obtained over several days by patient self-monitoring. Once FBG goal was met, patients were graduated from program and instructed to follow with their primary care team. The resident curriculum consists of four weekly 1-hour small-group sessions led by faculty, the diabetes nurse, and clinic nurse practitioner to improve diabetes medical knowledge and teamwork system based practice. These include patient cases illustrating team processes and feedback on clinic diabetes quality metrics. Online diabetes care knowledge modules are completed by faculty and residents also.

EVALUATION: Four hundred seventy-six patients had A1c values greater than 9.0 %; 155/476 (32.6 %) were referred to the program, and 149 were successfully contacted. 67/149 (44.9 %) patients successfully contacted met goal FBG at a median time from first contact of 48 (IQR 43) days. 24 (16.1 %) patients were still undergoing insulin titration at publication; 38 (15.5 %) were lost to follow up; and 20 (13.4 %) were referred to specialists or followed up outside our healthcare system. A per-protocol evaluation was conducted using pre- and post-intervention HbA1c values assessed near enrollment and approximately 3 months later. These were available at publication for 42 of 67 patients who reached goal, demonstrating a mean reduction in HbA1c of 3.31 % (SD 3.06) ($P<0.001$). Complete data will be available by April, 2015.

DISCUSSION / REFLECTION / LESSONS LEARNED: A teaching clinic-based nurse-led telephone basal insulin titration protocol for type 2 diabetes patients demonstrated good referral rates and rapid time to control of fasting blood glucose. Thirty-three percent of patients with uncontrolled diabetes were referred, representing good acceptance by faculty and residents. Though there is little prior research on time to FBG control by nurse phone intervention, 48 days from contact may be faster than could be achieved in usual care physician office visits. Patients also found the intervention acceptable. Ninety-six percent of those referred engaged with the nurse, possibly because referral was done by the primary care faculty or resident. The per-protocol change in A1c appears to be substantial in patients who achieve FBG goal. A complete population analysis for program efficacy is underway. This study is limited by small sample size, and available post-intervention A1c values may be from a subset of more motivated patients. Future work is underway to compare patient outcomes in this program to those receiving usual office-based care and to determine predictors of acceptability to providers and patients.

AN EDUCATIONAL IBOOK ON HANDHELD CARDIAC ULTRASOUND CASES Charles Nadeau-Routhier; Atul Jaidka; Matthew Church; Amer M. Johri. Queen's University, Kingston, ON, Canada. (Tracking ID #2196868)

NEEDS AND OBJECTIVES: Handheld cardiac ultrasound (HHCU), also known as focused cardiac ultrasound, is emerging as a valuable tool that can easily be integrated into the physical exam at the patient's bedside. In the hands of an experienced user, this compact portable imaging device has been shown to augment the diagnostic accuracy of the conventional cardiac physical exam. The curriculum of most medical schools and residency programs does not typically include dedicated teaching for learners to develop skills in HHCU. We created an interactive learning tool targeted at medical trainees that proposes an approach on how to interpret HHCU views in relation to clinical vignettes. This free resource takes the form of an iBook (a digital book format available on iPad and Mac computers). **Learning objectives:**—Understand and recognize standard handheld cardiac ultrasound (HHCU) views: apical four chamber view, parasternal long axis view, parasternal short axis view, and subcostal view.—Identify the anatomical landmarks of each standard HHCU view.—Provide a qualitative interpretation for each HHCU view in relation to a clinical vignette.—Summarize HHCU findings in a structured manner.—Develop a differential diagnosis using HHCU-derived information.

SETTING AND PARTICIPANTS: Target audience: Medical trainees (senior medical students and non-cardiology residents) with beginning/intermediate knowledge about cardiac ultrasound.

DESCRIPTION: The iBook begins with a tutorial chapter describing standard handheld cardiac ultrasound (HHCU) views and highlighting main anatomical landmarks. The introductory chapter is followed by a series of clinical cases, each of which incorporates the HHCU as part of the physical exam. The reader is then asked questions about the HHCU views such as: labelling cardiac structures, naming the major finding(s), commenting on the severity of the lesion(s), narrowing down the differential diagnosis and prioritizing the immediate next steps in the overall management. These self-assessment questions are followed by a brief discussion about the patient's particular clinical condition. Finally, each case is wrapped up with a suggested HHCU interpretation, a summary of the case, an acknowledgement of the limitations of the HHCU views, and immediate next steps in management.

EVALUATION: With our handheld cardiac ultrasound iBook now published and available for free online (as of December 2014), our objectives in evaluation of this resource are twofold: 1) Assessment of the usefulness of the resource: We have an upcoming session scheduled for senior medical students who have no prior experience with handheld cardiac ultrasound (HHCU). Participants will undergo a pre-test on their knowledge of HHCU, then will read through the tutorial and cases and be able to practice with HHCU devices. A post-test will be administered to assess knowledge development in this training session using our iBook resource. The pre-test and post-test will be in multiple-choice format and will consist of questions related to the learning objectives (see previous section) of our resource. 2) Assessment of the overall reach of the resource: The number of downloads is our measure of this objective. Daily data is available through the iBook online publishing platform.

DISCUSSION / REFLECTION / LESSONS LEARNED: The usefulness of this iBook consists of three key components: 1) Case-based, interactive, user-friendly learning tool: The iBook is designed such that the reader navigates throughout a stimulating, structured and self-directed learning environment. The real-world clinical cases used in the iBook facilitate integration of new knowledge by the learner. 2) Competency-based self-assessments for each clinical case: Within the iBook, self-assessments are used for evaluating the reader's newly acquired knowledge on handheld cardiac ultrasound (HHCU) interpretation. Questions are written in a similar pattern, quizzing first about anatomical landmarks, and then challenging the reader with questions of increasing difficulty. 3) Acknowledgement of the limitations of HHCU: There are two main obstacles facing effective implementation of HHCU in the cardiovascular assessment of a patient: lack of adequate training and lack of experience. This iBook focuses on the former obstacle. The case-based approach to interpreting HHCU views is meant to guide the trainee in appreciating the strengths and limitations of HHCU-derived information. Each clinical case reinforces the global thinking behind the decision-making process in the medical management of the patient. The essential message is that HHCU will augment but not replace a conventional cardiac physical exam.

ONLINE RESOURCE URL (OPTIONAL): Link: <https://itunes.apple.com/ca/book/handheld-cardiac-ultrasound/id950815260?mt=13> iBook: "Handheld Cardiac Ultrasound: Case Series" Published: Dec 11, 2014 (Available on iPad and Mac computers)

BRIDGING THE GAP: A POST HOSPITAL DISCHARGE VISIT CURRICULUM Brielle Spataro^{1,3}; Asher Tulskey²; Diane Comer²; Doris Rubio²; Carla Spagnoletti². ¹UPMC Presbyterian Hospital, Pittsburgh, PA; ²University of Pittsburgh, Pittsburgh, PA; ³VA Pittsburgh Healthcare System, Pittsburgh, PA. (Tracking ID #2193329)

NEEDS AND OBJECTIVES: The Accreditation Council for Graduate Medical Education and the American Board of Internal Medicine identify that internal medicine residents should be able to transition patients efficiently within and across health care delivery system. Medicare created "transitional care management" (TCM) criteria for post-hospital discharge services in the outpatient setting and reimburses at higher levels for these services. The transition of care from the inpatient to outpatient setting is a vulnerable time for patients. Following hospital discharge, patients may experience medical errors, adverse events and are readmitted to the hospital at unacceptable rates. The literature is primarily based on interventions to decrease errors and readmissions from the inpatient side of care. The objectives of this project were to 1) increase resident confidence with and attitudes about effective post-hospital discharge outpatient care and 2) standardize the post hospital discharge follow up visit and documentation in our internal medicine resident clinic.

SETTING AND PARTICIPANTS: A total of 48 PGY1, 2, and 3 internal medicine residents who see outpatients at a large academic center.

DESCRIPTION: We developed a curriculum consisting of a didactic and interactive case-based discussion regarding post discharge outpatient follow-up visits, a handout that highlighted key points, and a visit note template for the electronic medical record. The curriculum was implemented during a pre-clinic conference for all residents at our university-based resident clinic in January 2014. The curriculum was modeled after a

checklist for post-hospital discharge visits published by the California HealthCare Foundation and consistent with the Medicare requirements for a TCM visit. Key principles included review of the hospital course (including tests and studies), medication reconciliation, home care services, follow-up with consultants, goals of care and patient education. Clinic preceptors were debriefed on the curriculum, emailed a copy of the didactic presentation, and encouraged to attend the pre-clinic conference.

EVALUATION: A survey was given to participants immediately before the pre-clinic conference and 3 months later. The survey assessed resident attitudes and confidence level with providing transitional management care. Attitudes and confidence were assessed using a 5 point Likert-type scale. Attitude items addressed perceived importance and effectiveness of the curriculum. The survey also addressed demographic characteristics of the residents. The three month survey also assessed how often the residents used the template and how frequently they saw patients for the post-hospital discharge visit. Each participant was assigned a unique identifier and survey responses remained confidential. We found statistically significant increases in mean scores in resident attitudes and confidence at 3 months. Average attitude scores increased for importance of the discharge follow up visit from 4.3 to 4.6 ($p < 0.005$) and for seeing a patient within 14 days of hospitalization from 4.2 to 4.6 ($p < 0.05$). All aspects of confidence increased including ability to conduct the visit from 3.8 to 4.4 ($p < 0.0001$), provide adequate documentation from 3.5 to 4.4 ($p < 0.0001$), perform accurate medication reconciliations from 4.3 to 4.7 ($p < 0.005$), reduce hospital readmissions from 3.1 to 3.7 ($p < 0.005$), and reduce medical errors from 3.4 to 4.1 ($p < 0.0001$) in their clinic patients. On the 3 month follow up survey residents indicated they liked the template and 71 % of them had used it at some point since its introduction with 63 % using it at least half of the time. To evaluate whether residents used information taught in actual practice, a checklist, adapted from the California Healthcare Foundation criteria, will be used to grade outpatient documentation for post-hospital discharge visits for 6 months prior and 6 months after curricular implementation. Chart review for this portion of the project is currently underway.

DISCUSSION / REFLECTION / LESSONS LEARNED: We developed a curriculum to teach residents how to conduct a thorough post-hospital discharge visit with their outpatients, and provided them with a template to ensure adequate documentation of topics covered. Residents' confidence and attitudes towards providing TCM services improved. Project evaluation is ongoing to determine whether documentation improved in response to the curriculum. Other programs may benefit from a similar curricular effort in order to increase awareness of the unique aspects of the post-hospital discharge visit and ensure adequate documentation for these visits in order to meet TCM criteria for Medicare reimbursement. More research is needed to see if this training translates to clinical end points including decreased rates of medical errors and re-hospitalization.

BST MODE (BITE-SIZED TEACHING MODE): AN INNOVATIVE APPROACH TO MAXIMIZING RESIDENTS' EDUCATIONAL EFFICIENCY THROUGH A FACULTY-COACHED PEER TEACHING EXERCISE Jennifer O. Spicer²; Golub Lucas²; Kimberly D. Manning¹. ¹Emory University, Atlanta, GA; ²Emory University School of Medicine, Decatur, GA. (Tracking ID #2197614)

NEEDS AND OBJECTIVES: Attendance at internal medicine residency conferences has been shown to correlate with standardized examination scores, but duty hour restrictions continue to challenge residents balancing educational needs with patient care responsibilities. Shorter lecture length has been associated with improved learner satisfaction and knowledge retention, yet the standard hour-long lecture format prevails as the primary mode of didactics. We developed a new educational conference format of resident-taught "bite-sized" lectures with three principle aims: increase learners' satisfaction with and attendance at educational conferences; improve content delivery to encourage learners to pay attention to the entire lecture; and provide residents with the opportunity to develop their teaching skills.

SETTING AND PARTICIPANTS: At our institution, most formal didactic sessions for internal medicine residents consist of a 1-hour lecture at lunchtime each day. The attendance of medical students, interns, and residents is encouraged but not required. This bite sized teaching (B.S.T.) conference was a new educational initiative that replaced one lunchtime lecture each month. Emails were sent out to all internal medicine medical students, interns, residents, and faculty members rotating at the hospital informing them of the new conference. Recruitment emails were also sent to all interns and residents in the internal medicine program looking for volunteers interested in teaching the sessions.

DESCRIPTION: Five residents were selected for each conference, and each resident was instructed to prepare an engaging and high-yield 8-minute lecture focused on the subspecialty theme chosen for that date. A faculty mentor was assigned to each resident to aid with content selection, innovative use of audiovisual materials, and lecture delivery with observation and feedback. Following each conference, an electronic survey was sent to all attendees to assess: 1) satisfaction with the conference format, 2) effectiveness of the conference format, and 3) interest in attending similar conferences. A survey was also sent to the resident teachers to determine if preparing for this conference: 1) increased the

residents' ability to prepare an engaging lecture, 2) developed the residents' public speaking skills, and 3) improved the residents' confidence in teaching.

EVALUATION: Evaluation is ongoing, but audience survey responses have been collected following two of these conferences. Sixty-two individuals responded to the survey: 13 faculty members, 12 PGY-3 s, 9 PGY-2 s, 25 PGY-1 s, and 2 medical students. Respondents were satisfied with the teaching format of multiple short lectures (average rating 4.6 on a 5-point Likert scale) and preferred this format to the standard 1-hour lecture (average rating 4.3). Attendees felt that the shorter length of the lectures helped individuals pay attention (92 % agreed, 6 % neutral, 2 % disagreed), and almost everyone enjoyed having residents give the lectures (97 % agreed, 3 % neutral). One hundred percent of respondents said that they would be interested in attending this type of conference again. Comments included "best didactics of the year", "I usually struggle to stay awake...not for this", "shorter format was captivating and I learned a ton", and "I love this conference...so far I've driven from other hospitals twice to attend!". Seven of the nine residents who participated as teachers responded to the survey sent to them. All respondents strongly agreed that this experience: 1) increased their ability to great an engaging lecture (average rating 4.7 on a 5-point Likert scale), 2) developed their public speaking skills (average rating 4.6), and 3) improved their confidence in their teaching ability (average rating 5.0).

DISCUSSION / REFLECTION / LESSONS LEARNED: Innovative teaching formats are critical in graduate medical education given the increasing restraints on residents' educational time. Although online curricula have grown, these educational formats lack the personal engagement of lectures. Our bite-sized, high-yield lectures preserve the interaction of in-person education while forcing teachers to present topics in an efficient and memorable manner. Based on the feedback that we have obtained, learners appreciate the brevity and creativity of these lectures and their shorter format. By using residents as teachers, this conference format has the added benefit of providing residents with the opportunity to grow as educators and develop their public speaking skills. Pairing a faculty mentor with each resident ensures that the residents deliver high-quality lectures. Through this bite-sized teaching conference, we have introduced a novel conference format that provides engaging lectures in a time-efficient manner allowing five topics to be presented within 40 min.

CLINICAL REASONING CURRICULUM: TEACHING CLINICAL REASONING PRINCIPLES AS PART OF RESIDENCY EDUCATION Erin J. Goss¹; Shwetha Iyer¹; James Grigg²; Darlene LeFrancois¹; Gerald Paccione¹. ¹Montefiore Medical Center, Bronx, NY; ²University of Florida, Gainesville, FL. (Tracking ID #2199234)

NEEDS AND OBJECTIVES: Diagnostic errors are common, accounting for 40–80,000 deaths per year and an even higher morbidity in medical practice. Medical errors encountered in the primary care setting include errors in data gathering, interpretation of clinical, laboratory, and radiologic data, as well as the inappropriate use of heuristics (mental shortcuts). Medical students and residents are increasingly taught to reflect on their own clinical reasoning to potentially reduce sources of error. Over the past 2 years, we attempted to fill this gap in our own residency program by creating and implementing a clinical reasoning curriculum at our institution. We evaluated this course by assessing residents' knowledge and attitudes towards their competence of recognizing and applying clinical reasoning skills.

SETTING AND PARTICIPANTS: Our target audience was PGY2 residents in the Internal Medicine Residency Program at Montefiore Medical Center, Bronx, New York. Out of 75 residents, 25 opted to take the curriculum from December 2013 through December 2014.

DESCRIPTION: The Clinical Reasoning Curriculum is an elective 8-part seminar series offered to second year residents during an ambulatory rotation. The curriculum was initially created with input of five key faculty members following a thorough review of existing medical literature. It was devised to focus on key themes related to clinical reasoning and cognitive errors. Key themes include: Introduction to clinical reasoning theory, Use and interpretation of diagnostic tests, Causal reasoning, Bayesian analysis, Diagnostic verification, Cognitive errors, and Therapeutic decision-making. Each seminar focuses on 1–2 key themes and incorporates several educational strategies including 1) team based learning, 2) clinical vignettes highlighting key themes, 3) discussion of diagnostic dilemmas identified from participants' ambulatory clinic, and 4) journal clubs focused on medical education literature and clinical prediction rules. Seminars are facilitated by two core faculty members. Residents completed a 15-item questionnaire to self-assess their competence in certain clinical reasoning domains. Questions were scored on a 4 point Likert scale from 1=Not at all capable to 4=very capable. Survey scores before and after participation in the curriculum were compared using chi square analysis. In 2014, residents also completed a 9-item multiple-choice questionnaire to assess their knowledge on clinical reasoning topics. Scores on the knowledge assessment were compared using the Wilcoxon test.

EVALUATION: The curriculum has been offered 3 times in the past 2 years to approximately 25 residents. Seventeen residents completed the pre and post-test surveys (68 %).

Resident self-reported competency following completion of the elective increased significantly in 12 of 15 domains ($p < 0.05$ for each). Specific domains with the greatest increase in self-reported competency include Applying sensitivity and specificity to history and physical exam findings, Applying Bayesian analysis to clinical scenarios, and Identifying errors in diagnostic verification. Less than 40 % of residents reported being “somewhat” or “very capable” in these 3 domains before the course, compared to greater than 80 % afterward. Resident scores on the knowledge assessment improved from 77.8 % \pm 7 to 96.2 % \pm 5.6 following the elective ($p = 0.002$).

DISCUSSION / REFLECTION / LESSONS LEARNED: Participation in this clinical reasoning curriculum improved resident confidence in recognizing and performing several clinical reasoning skills. Our evaluation supports the literature that residents can be taught to recognize clinical reasoning processes. Residents reported the greatest increase in their ability to applying quantitative reasoning strategies (like Bayesian analysis) to clinical scenarios. This may be due to less familiarity at baseline with this type of reasoning strategy. Months later, several residents commented that they felt more able to reflect on their own reasoning process and recognize potential errors. Further evaluation is needed to investigate whether course participation is associated with longer-term changes in attitudes as well as application of clinical reasoning skills during precepting and patient care.

COMPLEX CASE CONFERENCE: MULTI-DISCIPLINARY ROUNDS IN AN OUTPATIENT RESIDENCY CLINIC Brinton Clark¹; Mari Kai². ¹Providence Portland Medical Center, Portland, OR; ²providence portland medical center, Portland, OR. (Tracking ID #2199505)

NEEDS AND OBJECTIVES: There is increasing emphasis placed on multi-disciplinary care teams within the patient-centered medical home model (PCMH). Teaching resident physicians to be successful leaders in PCMH settings is an important dimension of their training. In addition, residents must learn to successfully manage their most complex patients by optimally using multi-disciplinary team members in care. Many residents have complex patients in their residency continuity clinic. Many of these patients have both complicated medical histories as well as complex psychosocial factors. Our experience is that residents often feel overwhelmed in caring for this population and do not always fully utilize the multi-disciplinary resources available in our clinic setting. Our objective was to develop a complex care conference, where residents can present their most complicated patients to a multi-disciplinary team. The goal was for the resident to hear multiple perspectives and advice from different team members. The team would help the resident develop a comprehensive plan to tackle complex problems. The ultimate goal is to deliver the highest quality, patient-centered care for complex patients and for residents to learn how care can be optimized by working with a multi-disciplinary team. By giving the residents time to review patients in depth, we also hoped they would have a better grasp of their complicated patients.

SETTING AND PARTICIPANTS: Providence Portland Medical Center is a community-based residency program with 30 internal medicine residents and 10 general medicine faculty. We have a resident-faculty internal medicine clinic practice officially designated as a PCMH. Our multi-disciplinary team includes a social worker/case manager, clinical pharmacist, behaviorist/psychologist, psychiatrist, community outreach worker, nurse, and medical assistants.

DESCRIPTION: The Complex Case Conference (CCC) was implemented in our program 18 months ago. Each week, the PGY1 or PGY2 resident on ambulatory block rotation reviews one of their most complex patients to present for CCC. The resident presents the case in structured format to the multi-disciplinary team including the team general medicine faculty. The resident raises specific questions and issues that they would like input on to optimize care for their patient. The resident leads the multi-disciplinary team in a 1 h discussion of the patient and together they come up with strategies for engaging the patient in care and improving their health outcomes. Discussions focus both on complex medical problems and psychosocial issues affecting care. Resident physician documents the care plan in the patient's chart in a structured format. After the CCC, team faculty and resident meet to review successes and areas for growth in leading the conference. The faculty member completes a direct observation evaluation of the resident which incorporates ACGME milestones (PC2, SBP1, PBLI3, PROF1, PROF3, ICS2).

EVALUATION: Since its inception, approximately 60 Complex Case Conferences have taken place with nearly 250 milestones captured. Feedback on CCC is sought during the end-of-rotation debriefing by the clinic medical director. CCC has been a highly rated and valued experience. Residents state the conference has been a great opportunity to improve care for challenging patients, and increases their ability to engage the multi-disciplinary team not only for the patients presented at CCC but also for other patients. We will present qualitative feedback from residents.

DISCUSSION / REFLECTION / LESSONS LEARNED: Although internal medicine residents often participate in multi-disciplinary rounds in the hospital setting, we feel our Complex Case Conference represents a unique model for resident engagement in multi-

disciplinary team rounds in the ambulatory setting. Our CCC helps to improve multi-disciplinary communication within a PCMH, teaches residents leadership skills, and enhances team-based care for patients with complex medical and psychosocial needs. Evaluation of resident's ability to lead CCC allows faculty to capture resident skills in communicating effectively with a multi-disciplinary. As our CCC has been highly successful and achieved the goals we set out to accomplish, we plan to continue our innovation.

DELIVERING PRIMARY CARE BEHIND BARS: DEVELOPING A STUDENT-FACULTY COLLABORATIVE CLINIC IN A BOSTON JAIL Kimberly Sue⁴; Samuel L. Dickman⁴; Manjinder Kandola⁴; Stephanie Choi⁴; Nora Abo-Sido⁴; Meissa M. Jones³; Jacquelyn Moss¹; Marya J. Cohen². ¹Harvard Medical School/MGH-Chelsea, Boston, MA; ²MGH, Boston, MA; ³Massachusetts General Hospital, Boston, MA; ⁴Harvard Medical School, Boston, MA. (Tracking ID #2191972)

NEEDS AND OBJECTIVES: Incarcerated patients or patients with a history of incarceration face numerous structural and health disparities that predispose them to increased morbidity and mortality. Our model allows medical students to simultaneously address these neglected health issues with a structural intervention while also learning about important social determinants of health and the practice of social medicine in a real world setting. Objectives: 1) To provide health care and education specifically addressing the needs of incarcerated patients, and to improve the continuity of care post-release. 2) To establish a student-faculty clinic to better present health disparities and social medicine to medical and nurse practitioner students in a real-world setting.

SETTING AND PARTICIPANTS: The Nashua Street Jail is a men's facility where inmates stay for a period ranging from several days to 2 years. The majority of inmates are pre-trial detainees or those currently engaged in court processes. The clinic is staffed by approximately 30 students and takes place at the jail two evenings a month. The students see patients in teams of two while precepted by an attending physician from a local community health clinic, Massachusetts General Hospital-Chelsea, or by a resident preceptor. Furthermore, students not providing direct patient care engage in inmate health education on the housing units as well as conduct research. The night generally concludes with a brief educational session led by the resident preceptor relating to a health condition observed during the clinic.

DESCRIPTION: This clinic focuses on providing compassionate, evidence-based healthcare to inmates with a specific focus on the transition back to the community. It is a unique, collaborative clinic between Harvard Medical School students, MGH-Institute for Health Professionals students, the Nashua Street Jail and the Stoeckle Center for Primary Care Innovation. The clinic complements a non-academic private clinical service that provides the majority of care for inmates. In the pilot semester this student-faculty clinic involved approximately 30 students. Many of these students saw patients alongside the residents and the attending physician. Students on the inmate education team delivered workshops to inmates in a larger-group setting on topics such as nutrition and Hepatitis C virus. In addition, students on the research team formulated a project centered on diabetes management in the jail which will commence in the spring semester.

EVALUATION: Students are participating in qualitative assessments of their experience in this clinical environment, including measurements on interest/motivation to practice primary care, interest in health disparities/social medicine, as well as their subjective experiences of clinical skills and history-taking. There are further plans for qualitative assessments of the clinic by patient-inmates and resident preceptors in the upcoming semester.

DISCUSSION / REFLECTION / LESSONS LEARNED: 1) There are currently few existing partnerships between prisons or jails and primary care training programs (including medical schools). However, such programs undoubtedly present valuable opportunities. This clinic demonstrates the potential for increased transparency of prison-based healthcare through providing greater continuity of care pre and post-release of inmates. 2) With careful planning and appropriate learning methods, such a program can be an effective teaching tool for medical and nursing students to learn about the chronic and mental illnesses that are common in the prison population. Consequently, this program allows students to gain exposure to the structures and systems that directly contribute to health disparities affecting millions of Americans.

DEVELOPING A LEARNER CENTERED MULTIMODAL AMBULATORY TEACHING PROGRAM FOR SENIOR HOUSESTAFF: THREE-YEAR FOLLOW-UP Sudha Dubey²; Darlene LeFrancois³; Sheira Schlair¹. ¹Albert Einstein College of Medicine/Montefiore Medical Center, Bronx, NY; ²Mount Sinai Beth Israel, New York, NY; ³Montefiore Medical Center, Bronx, NY. (Tracking ID #2199560)

NEEDS AND OBJECTIVES: While there are ample observed teaching opportunities for residents on inpatient rotations, academic training programs rarely create formal

teaching opportunities for residents in the ambulatory setting. Our objective was to create a curriculum and formalized ambulatory teaching program to coach senior residents.

SETTING AND PARTICIPANTS: Senior internal medicine residents, interns and fourth year ambulatory rotation medical students, and attending supervisors at three ambulatory internal medicine clinic sites at Montefiore Medical Center (Bronx, NY) from 2012 to 2014.

DESCRIPTION: In 2012 when senior residents identified an interest in obtaining ambulatory teaching skill experience, a “resident as preceptor” elective was created. In this pilot, one faculty member led a 2-hour learner-centered curriculum focused on effective ambulatory teaching strategies, adult learning theory, the 1-minute preceptor model and RIME scheme. Sentinel readings were provided. Residents who opted in were then assigned to precept medical students for 1–2 sessions each supervised by an attending physician instructed to silently observe the session and interject only if they disagreed with management. Formal feedback was obtained by surveys of program participants. Starting in 2013, this training model was integrated into a new residency-wide “Resident as Teacher” PGY-3 elective, which focuses on teaching skills in multiple venues but continues to incorporate resident ambulatory teaching as a core component. The elective now includes three separate ambulatory clinic sites and a larger group of resident preceptors and attending observers, with interns as learners.

EVALUATION: Resident preceptors, learners, and supervising attendings were surveyed anonymously and voluntarily at the conclusion of each observed precepting session in order to promote systematic real-time feedback. Survey items targeted precepting goals and learner satisfaction. All questions were scored on a 1–4 Likert scale (1: strongly agree, 2: agree, 3: disagree, 4: strongly disagree) or open-ended qualitative format. Precepting goals mirrored the curricular intervention content about the one minute preceptor model, namely to what degree the resident preceptor: 1. Elicited clinical reasoning and independent assessment and plan; 2. Taught general principles; 3. Delivered behaviorally specific positive feedback; 4. Corrected errors with specific feedback; and 5. Completed the encounter efficiently. To date, 46 attending surveys, 40 learner surveys, and 45 resident preceptor surveys have been collected. Qualitative and quantitative data reveal an overwhelmingly positive assessment of achieving precepting and programmatic goals. Ninety-seven percent of attendings, 97 % of learners, and 93 % of resident preceptors agreed or strongly agreed that the learner’s clinical reasoning was effectively elicited. Ninety-five percent of attendings, 97 % of learners, and 93 % of resident preceptors agreed or strongly agreed that residents taught general principles. Ninety-one percent of attendings, 92 % of learners, and 77 % of resident preceptors agreed or strongly agreed that the encounter was completed in a timely way. Over 70 % of residents each year indicated that they felt comfortable in their role as preceptor and over 80 % indicated that the experience added value to their residency training. Qualitative survey comments from learners suggested increased focus on teaching of physical exam skills by resident preceptors. Further analysis will be performed with final data collection in spring 2015 using paired t-tests in order to examine for associations between resident, attending and learner assessments.

DISCUSSION / REFLECTION / LESSONS LEARNED: Three-year pooled data analysis suggests that a self-selected group of senior residents were quite effective at applying lessons learned about adult learning theory and learner assessment in observed precepting encounters. On preliminary analysis, it appeared that time management was one of the greatest challenges, which may suggest that residents require more experience to promote efficiency. Residents were their own harshest critics, followed by attendings and lastly by learners who give the most positive feedback. This is akin to previous literature suggesting that physicians may be poor self-assessors. Learners indicate an overall very positive experience, which may be partially due to comfort and decreased stress in working with senior residents who they consider peers rather than with supervising attendings. Overall learners and residents consistently rank this elective as an educationally valuable experience and it has demonstrated value in expanding educational and assessment opportunities to the ambulatory setting. Future work is warranted to develop more robust program and learner assessment methods and to integrate peer assessment methods and observation training into the curriculum.

DEVELOPING AND EVALUATING THE ROUNDS TABLE PODCAST FOR CONTINUING MEDICAL EDUCATION IN GENERAL ADULT MEDICINE Amol Verma¹; Hareem Naveed²; Fahad Razak^{1, 3}. ¹University of Toronto, Oakville, ON, Canada; ²University of Toronto, Toronto, ON, Canada; ³St. Michael’s Hospital, Toronto, ON, Canada. (Tracking ID #2199508)

NEEDS AND OBJECTIVES: The *Rounds Table* (TRT) is a new free weekly podcast devoted to general adult medicine that is approved for Category 1 Continuing Medical Education (CME) credits in the United States and Canada. The needs assessment included an environmental scan, literature review, and consultation with practicing clinicians, which revealed: 1) It is difficult for clinicians to stay current with academic literature. 2) Web-based educational materials such as podcasts can facilitate CME. 3) Podcasts are typically produced by academic journals or specialty groups, thus relatively few are

devoted to general adult medicine. 4) Many existing medical podcasts are difficult to listen to because they present dry academic content without analysis or humor. 5) Evaluations of podcasts have occurred chiefly in traditional undergraduate medical education settings. Podcasts in CME have received relatively little study. The objectives of TRT are to: 1) Develop a podcast that can be sustainably produced by busy clinicians. 2) Offer rigorous analysis about new research in adult medicine. 3) Target a diverse audience of generalist clinicians. 4) Provide content that is entertaining and easy to listen to.

SETTING AND PARTICIPANTS: TRT is hosted by a team of early-career academic clinicians. The following strategies allow regular high-quality content production despite busy schedules: Interns manage the sound editing, uploading and social media. Every episode is hosted by two clinicians from a rotating team who each present one study. Thus, each host must learn only one study in detail every few weeks. TRT is aimed at a general audience of clinicians and trainees who are interested in adult medicine. Episodes are hosted by the non-profit health affairs website, *Healthy Debate*. Listeners can access the podcast online or through iTunes.

DESCRIPTION: TRT episodes are 20 to 30 min long and present new medical studies that are selected using the following criteria: 1) Likely to have significant clinical impact. 2) Relevant to generalist clinicians in adult medicine. 3) Collectively represent diverse topics. TRT has been developed in accordance with pedagogical principles. It uses a conversational style, provides *priming* and *pre-training* to allow listeners to process information, highlights essential material, and eliminates extraneous information.

EVALUATION: A mixed-methods evaluation of TRT is underway. Patterns of use are being studied using *Blubrry* podcast analytics. Listener perspectives are being assessed using CME evaluation forms and a listener survey. Since its launch in March 2014, 32 new episodes of TRT have been published online. Web analytic data has been collected since October 2014. The podcast is downloaded approximately 4000 times per month. Canadian and American listeners account for 55 and 38 % of downloads, respectively, and there are listeners in 37 countries around the world. Older episodes continue to be downloaded long after their release. For example, episodes posted in March were downloaded nearly 500 times between October and December. The majority of episodes (69 %) were downloaded directly to mobile devices. In total, 38 CME feedback forms were submitted. Of these, 35 (92 %) indicated that the podcast met the stated learning objectives. All 38 responses (100 %) stated that they learned something new and felt the material was of clinical importance, 23 (61 %) noted that their practice would be improved, and 28 (74 %) were motivated to learn more. A web-based survey to solicit listener perceptions on style, content, and impact was launched on November 26, 2014. Complete results will be available for presentation by April 2015. A preliminary thematic analysis of 14 responses suggests that listeners value the podcast’s conversational tone, short episode length, and portability.

DISCUSSION / REFLECTION / LESSONS LEARNED: TRT uses an innovative platform to help clinicians stay abreast of research in adult medicine. The podcast is novel because it provides analysis and context about new research, draws from a variety of scientific journals, and specifically targets a general audience. The format permits busy academic clinicians to produce a regular high-quality podcast and could be replicated. The TRT evaluation is ongoing. An online survey will provide further information about listener perceptions and may help answer questions about why relatively few have redeemed CME credits. TRT listeners predominantly uses mobile devices, which differs from podcasts in traditional medical education where students prefer to listen on a desktop computer without distractions. Episodes continue to be downloaded long after they are published, suggesting that people listen to the podcast asynchronously, not according to its weekly schedule. These findings suggest that TRT listeners value portability and flexibility. Tens of thousands of downloads and a global audience in the first year of production suggests that TRT is widely appealing and highlights the potential of podcasts in CME.

ONLINE RESOURCE URL (OPTIONAL): <http://healthydebate.ca/about-us/the-rounds-table>

DEVELOPING FACULTY SKILLS IN VETERAN-CENTERED CARE: UNDERSTANDING WHERE SOLDIERS REALLY COME FROM Monica L. Lypson¹; Paula Ross¹; Divy Ravindranath MD, MS². ¹University of Michigan, Ann Arbor, MI; ²VA Palo Alto Healthcare System, Palo Alto, CA. (Tracking ID #2189755)

NEEDS AND OBJECTIVES: Faculty development is one strategy for answering the call to improve the care of our nations’ military personnel. Within the medical education context, faculty development is critical for ensuring trainees receive proper education, effective feedback, and witness appropriately role-modeled behavior. Trainees commonly learn to care for military patients through rotations at affiliated Veterans Affairs (VA) hospitals, where their cultural competence develops via modeled physician behavior, teaching and direct patient care. In 2013, over 20,000 medical students and 40,000 residents received their medical training at a VA Health Center. As such, it is essential that faculty are prepared to educate their trainees to care for veteran patients, regardless of

location (e.g., civilian or VA). We developed a multi-stage faculty development workshop for practicing clinicians using an award-winning documentary *Where Soldiers Come From*® as well as other active learning techniques focusing on the invisible wounds of war, primarily Traumatic Brain Injury (TBI) and Post-Traumatic Stress Disorder (PTSD).

SETTING AND PARTICIPANTS: The 90-min faculty development workshop has been conducted at three separate locations (two VA centers and one national conference) with 46 health care professionals. The 34 participants who completed the anonymous workshop evaluations included 27 physicians, 3 nurses, and 1 psychologist (6 participants did not list their role), 31 indicated they practiced in a VA Health Center.

DESCRIPTION: This active-learning workshop guided faculty through a series of activities to develop their skills in the delivery of veteran-centered care. Upon viewing scenes from the award-winning documentary *Where Soldiers Come From*® participants engaged in semi-structured discussions as well as small group active-learning exercises, such as paired and group discussions, and reflective writing. Scenes from the documentary were used as the basis for faculty to explore their own personal and professional experiences and identities. Faculty members were also guided in activities to help them develop their teaching skills and identify strategies train learners at their home institution on veteran-centered care.

EVALUATION: In this workshop, participants: Acknowledged their personal assumptions of veterans Identified subtle symptoms for patients with PTSD and TBI Recognized potential barriers patients face to receiving medical care Recommended strategies patients can use to circumvent barriers to care Discussed changes they would make in their approach to caring for patients with PTSD and TBI The evaluation results indicated that 78 % of participants indicated that the activity changed their knowledge/attitudes/skills, 59 % stated they had a better understanding of how to develop a care plan for veterans, 65 % of participants stated they gained a better understanding of how to prepare for issues around the returning veterans. Even with the majority of participants hailing from a VA Center, 97 % indicated that the scenes from the documentary helped them to reflect on their own attitudes toward veterans.

DISCUSSION / REFLECTION / LESSONS LEARNED: The delivery of veteran-centered care has remained elusive at all levels of medical training, thus training faculty in this area is an important step in developing skills and knowledge related to military and veteran culture and facilitating better care to the surge of over 2.6 million returning military personnel.

ONLINE RESOURCE URL (OPTIONAL): The materials for this workshop are available on MedEdPORTAL Publications: <https://www.mededportal.org/publication/9818>

DEVELOPING QUALITY IMPROVEMENT LEADERS: A PILOT CURRICULUM FOR INTERNAL MEDICINE RESIDENTS Rachel Hathaway; Maren Batalden; Priyank Jain. Cambridge Health Alliance, Cambridge, MA. (Tracking ID #2192650)

NEEDS AND OBJECTIVES: The ACGME has identified competency in leadership and quality improvement as a requirement for Internal Medicine residents. In order to address this need, we have expanded our curriculum from a didactic series to now include substantive engagement in quality improvement (QI) initiatives. This initiative embeds QI work within the existing structure of resident ambulatory continuity clinic sites. We have developed a pilot longitudinal QI curriculum for our Internal Medicine training program with the following learning objectives. 1) Residents will have increased awareness of quality and safety issues during clinical experiences, 2) residents will learn how to identify opportunities for improvement of care, 3) residents will learn principles and methods of quality improvement, and 4) residents will execute a longitudinal quality improvement project in the ambulatory setting.

SETTING AND PARTICIPANTS: The Internal Medicine residency program at Cambridge Health Alliance (CHA) is an academic, community based primary care training program, with a total of 24 trainees. Resident schedules are organized in a "2+4" immersion schedule, where they participate in 2 weeks of ambulatory rotations alternating with 4 weeks of other experiences (inpatient wards, ICU, etc.). Eight residents across three training years rotate with each other on ambulatory rotations, and come together every 6 weeks throughout the academic year, facilitating a planned longitudinal curriculum. Residents are supported and mentored by the course director, ambulatory quality directors, and clinic level leadership.

DESCRIPTION: The curriculum is comprised of three longitudinal components. First, residents will complete the Institute for Healthcare Improvement (IHI) Open School Quality Improvement Practicum which serves as a scaffolding for the course using the principles of the flipped classroom. Residents completed the IHI prerequisite courses early in the curriculum in order gain foundational knowledge, thus allowing them to engage in more interactive learning. Second, residents also participate in CHA QI and patient safety didactics. These didactics are six 90 min sessions spaced throughout the year lead by a

faculty expert in QI. The sessions address current quality and patient safety work that is occurring at CHA, as well as broader learning objectives related to quality improvement. Third, the curriculum incorporates experiential learning, as the residents design and execute an ambulatory quality improvement project. They are collaborating with clinic leadership from their primary care clinic to design a project, apply QI tools (i.e. cause and effect diagrams) and then run several PDSA cycles. The data from this project will be collected and reported within our institution, as well as more broadly.

EVALUATION: Residents' knowledge and attitudes will be evaluated via a post-course survey. Project mentors will evaluate resident participation and leadership in QI ambulatory cohort. Residents' RISK report filing will be used to assess identification of patient safety concerns and engaging institutional processes. RISK reports are the institutional system for employees to report patient safety concerns. Data collection is underway and will be available at the time of the National SGIM meeting.

DISCUSSION / REFLECTION / LESSONS LEARNED: We have already learned several lessons from this pilot curriculum. When designing a QI project for residents, the scope and size of the project is critical. By implementing the same initiative in three clinics, it allows for micro level experimentation as well as larger institution-wide effort. Sufficient dedicated curricular time is important for advancing the project. Further, we have found that it is helpful to integrate the project with existing improvement infrastructures. Residents were encouraged to explore ongoing institutional quality work and to develop a project within that in order to engage existing supports and to learn about real-life institutional change that is occurring. This ensured that the residents' project was meaningful while not being too time intensive, as there are many competing educational priorities.

DEVELOPMENT, IMPLEMENTATION, AND ASSESSMENT OF A CURRICULUM FOR INTERNAL MEDICINE RESIDENTS ON ELECTRONIC COMMUNICATION WITH PATIENTS Katherine C. Wrenn; Christy K. Boscardin; Alexandra Ristow; Karen E. Hauer. University of California, San Francisco, San Francisco, CA. (Tracking ID #2194186)

NEEDS AND OBJECTIVES: Physicians are increasingly communicating with patients via email and secure messaging. To ensure safe and effective patient care, there is a need to train residents in how to communicate with patients electronically. However, few residency programs have curricula dedicated to this topic, and tools to assess electronic communication skills are lacking. Thus, our objectives are to: 1) develop and implement a curriculum for internal medicine (IM) residents on electronic communication with patients; 2) develop an assessment tool to evaluate residents' electronic communication skills; and 3) use the tool to assess the effectiveness of the curriculum.

SETTING AND PARTICIPANTS: We developed a curriculum for IM residents at UCSF who have a continuity clinic at the Mt. Zion campus. The clinic uses an electronic health record (Epic Systems, Inc.), with a secure, web-based portal that allows patients to send secure messages to their physicians. We are developing an assessment tool to evaluate residents' electronic communication skills and assess the effectiveness of the curriculum. Our study population for this phase of the project includes 20 PGY-1 residents during the 2014–2015 academic year who participated in the curriculum, and 20 residents who were PGY-1 residents the prior year and did not participate in the curriculum (historical controls).

DESCRIPTION: We created and distributed a targeted needs assessment survey to IM faculty and residents at the clinic during monthly meetings. A literature search and the needs assessment guided curriculum development using the 6-step curriculum development model (Kem). The 1-h curriculum includes a didactic component and case-based learning, with the goals: 1) review guidelines, policies, and expectations related to electronic messaging; 2) prepare residents to communicate electronically with patients in a professional manner; and 3) teach residents to triage messages appropriately and work within an inter-professional team. We piloted the curriculum in spring 2014, and conducted pre- and post- satisfaction surveys. We implemented the curriculum for all PGY-1 residents in fall 2014. Based on guidelines for tool development (Artino 2014), we are developing a tool to evaluate residents' electronic communication skills. Information from a literature review and interviews with expert faculty will define effective electronic communication skills and inform items for a checklist that represent these skills. As part of gathering evidence for content validity, we will consult with expert faculty about tool content and the items' representativeness, clarity, and relevance. We will then revise and pilot test the tool. We will conduct a prospective cohort study investigating if curriculum participants demonstrate better electronic communication skills than non-participants. We will analyze de-identified messages sent during a 1-month period, 2 months after the curriculum, to evaluate sustained effects (intervention residents), and messages from the prior resident class in the same 1-month period 1 year prior (historical controls). Using our tool, raters blinded to study group will score the messages. We will calculate mean scores, mean differences, and 95 % CIs. Our preliminary plan is to conduct unpaired *t*-test

analyses to examine differences between intervention and historical control residents' average scores.

EVALUATION: Of 37 faculty members, 26 received needs assessment surveys during monthly clinic meetings, and of 65 residents, 34 received surveys. The faculty response rate was 85 % (60 % total faculty); the resident response rate was 97 % (51 % total residents). Most (85 %) residents did not have prior training about electronic communication, and 68 % desired training. Among faculty, 100 % agreed such training is important. 26 PGY-1 residents participated in the curriculum in fall 2014; 22 completed pre- and post-surveys. Eighty-six percent agreed/strongly agreed that the curriculum covered topics relevant to their clinical practice. Sixty-four percent agreed/strongly agreed with a statement that they would change the way they respond to patient messages. The percentage of residents who agreed/strongly agreed that they felt comfortable responding to electronic messages increased from 59 to 77 %. We will use the assessment tool we develop to evaluate if participation in the curriculum leads to better electronic communication skills.

DISCUSSION / REFLECTION / LESSONS LEARNED: Most participants felt that the curriculum covered topics relevant to their clinical practice, and that, based on the curriculum, they would change the way they respond to patient messages. Participation increased comfort in responding to messages. We will study if the curriculum improves electronic communication skills. Tools to assess residents' electronic communication skills are lacking, and thus we are creating an assessment tool to serve this need. The instrument may be used not only as a curricular evaluation tool, but also as a tool for assessing competency in communication skills for residents at other institutions.

DOES FLIPPING THE CLASSROOM IMPROVE CLINICAL SKILLS?

Barbara Porter²; mridula naidu³; Sondra Zabar³; Lisa Altshuler³; Margaret Horlick¹.
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NEEDS AND OBJECTIVES: In a needs assessment of our curriculum we noted knowledge gaps in the musculoskeletal exam and in women's health. In years past, we sought to bridge this gap with OSCE cases on knee pain and prescribing OCPs. Despite this intervention, residents continued to report feeling unprepared in these areas. We therefore sought to bolster the retention of material taught in the OSCE by "flipping the classroom", i.e. providing multimedia educational material to our residents prior to their OSCE session. The objectives of our curricular innovation were that learners would be able to: perform a knee exam, identify pathology, and counsel a patient on next steps; counsel a patient on risks and benefits of oral contraceptive therapy; retain curricular material delivered via different modalities, and use this knowledge to diagnose, counsel, and activate patients.

SETTING AND PARTICIPANTS: Forty-three PGY2 Internal Medicine residents participating in an OSCE.

DESCRIPTION: In prior years, residents were not given any information about cases prior to the OSCE. In 2014, 3–5 days before the OSCE, residents received an email alerting them that their OSCE would include a case of knee pain or contraception counseling, and that they might find it helpful to review either an instructional video or attached reading prior to participating in the case. Before the OSCE, 31 residents were given material on the knee exam, 12 residents were given material on prescribing OCPs. Each OSCE actor was trained in standardized patient portrayal and evaluation. A checklist assessing general communication and case specific skills was completed immediately following each resident's participation. The evaluation tool had response options of not done, partly done and well done, each offering descriptive behavioral anchors to enhance rating reliability.

EVALUATION: In the domains of communication, patient activation, and patient satisfaction, residents who received a video of the knee exam ($n=31$) prior to the OSCE scored no differently than residents who did not ($n=12$) (Communication (0.48 vs 0.51 (t score = -0.43; $p=0.67$), patient activation (0.26 vs 0.33 (t score = -0.66; $p=0.51$)), patient satisfaction (0.37 vs 0.40 (t score = -0.22; $p=0.83$))). Residents who received educational material about oral contraception ($n=12$) scored no differently than residents who did not ($n=23$) in the domains of communication and patient satisfaction, but did score significantly better in patient activation (communication (0.56 vs 0.51 (t score = 0.55; $p=0.58$)), patient activation (0.75 vs 0.48 (t score = 2.06; $p=0.047$)), patient satisfaction (0.54 vs 0.53 (t score = 0.077; $p=0.93$))).

DISCUSSION / REFLECTION / LESSONS LEARNED: We believed that flipping the classroom, i.e. providing education material to a resident before a clinical encounter, would improve our residents' clinical skills and lead to higher patient satisfaction. Our limited study does not support this hypothesis. We postulate that there are advanced clinical skills, such as musculoskeletal exam skills, that improve only with supervision and repeated clinical practice and supervision. In the past, we have seen correlations between clinical skills and patient satisfaction and activation, but this study suggests that asynchronous, independent training may not be the way to boost these clinical and

communication skills. The significant difference in the patient activation score in the oral contraception case weakly suggests that a provider's knowledge about contraception may lead to a more activated patient. It is difficult to draw a conclusion based on the small number of residents who received material prior to the oral contraception case. Flipping the classroom, or asynchronous education, has been studied in other educational venues, including undergraduate medical education, but there is very limited evidence in the literature of its value in graduate medical education. We intend to continue this study to learn what curricular material is best suited for this venue in order to have measurable impact on clinical skills.

DYAD TEAMS: INTERPROFESSIONAL COLLABORATION AND LEARNING IN THE AMBULATORY SETTING

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NEEDS AND OBJECTIVES: Interprofessional collaboration is not just about "learning to work together, it is about working to learn together" (Howkins, 2012). Current healthcare professional education models do not have many venues where interprofessional learning takes place side by side thus physician trainees and nurse practitioner (NP) students are ill-prepared to practice together after graduation. Additionally, teaching in ambulatory settings is still faculty driven and "resident teaching residents" still thought to be an inpatient activity. Current health care educational models need to be redesigned so more venues allow for "working to learn together."

SETTING AND PARTICIPANTS: In our VA Center of Excellence in Primary Care Education – Transforming Outpatient Care (TOPC CoE), we combine MD Residency and NP Student training and address interprofessional collaboration through clinical care workplace learning to teach communication, negotiation, delegation and collaboration. The redesign strategy we implemented is a dyad work place learning experience in which MD Residents and NP students work together one half day a week in our primary care clinics.

DESCRIPTION: The goal of the weekly 4 h dyad clinic is to provide care for 4 primary care patients while incorporating ambulatory teaching skills learned during microteaching sessions. These sessions are 5–10 min faculty lead discussion at the outset of the dyad clinic that expand on interprofessional team skills and principles of the RIME (Reporter-Interpreter-Manager-Educator) model (Pangaro, 1999). The educational model promotes reflection and continual learning that is an essential feature for quality outpatient primary care.

EVALUATION: From July 2013 to December 2014, 22 dyad pairs completed a 12 week rotation working together in the primary care clinic. A two part survey evaluation was administered four times a rotation to monitor progress and improve the dyad experience. Of the 22 dyad pairs, 16 completed the evaluations at the beginning and end of a rotation. MD Residents perceived the act of allowing the NP students to develop a diagnostic commitment and treatment plan (average increase of 1.2 on 1–7 scale) with provision of supporting evidence (average increase of 0.96 on 1–7 scale) as the areas of greatest improvement, illustrating increased confidence in communication, negotiating and delegation. The NP Students also showed an increase in these categories but it was lower (average increase of 0.30 and 0.34 respectively). NP students perceived provision of specific performance feedback from MD Residents as the greatest area of improvement (average increase of 0.69 on 1–7 scale), which corresponded with MD Resident self-report of feedback provision to NP students (average increase of 0.91). These results are evidence of increased communication and collaboration among the learners. MD and NP perceptions diverged most in the area of opportunity identification for clinical improvement. NP students reported a lack of improvement on the part of the MD Resident in encouragement and identification of opportunities for clinical improvement (average decrease of 0.2 on a 1–7 scale), whereas MD Residents consistently self-reported improvement in this skill (average increase of 0.92).

DISCUSSION / REFLECTION / LESSONS LEARNED: The dyad work place learning experience has enhanced communication, negotiation, delegation and collaboration among MD Residents and NP Students in the VA TOPC CoE. This was illustrated in increased scores in these areas as well as in ensuring students provided supporting evidence for this decision. Additionally, it was found that the dyad model was an effective method of addressing preceptor shortage within the primary care clinic and should be investigated for translatability to other ambulatory settings. Lessons learned were numerous; however two stand out. First was the aspect of feedback where learners reported low scores, indicating a deficiency in feedback exchange. In the spirit of process improvement, dyad faculty developed a micro teaching session dedicated to providing and receiving feedback among learners. Additionally, faculty remained available to learners for support and guidance in situations where feedback was imperative. Secondly, the divergent perceptions among learners regarding opportunities for clinical improvement and

encouragement are worth noting. NP students and MD residents reported different outcomes and moving forward faculty plan to identify specific experiences and opportunities for learner development which will serve to better understand this gap. Implementing, maintaining and improving the dyad work place learning experience has been a labor intensive process that demands time, effort and dedication of the clinicians and staff involved. However, this approach ensures a high quality educational experience. Moreover, this educational model helps address the preceptor shortage pervasive in many ambulatory clinics.

EMPOWERING ACTION: A RESIDENT-LED CURRICULUM IN PHYSICIAN ADVOCACY Zoe Tseng^{1, 2}; Megha Garg²; Pamela Egan²; Grayson Baird³; Kelly McGarry². ¹Brigham and Women's Hospital, Boston, MA; ²Brown Alpert Medical School, Providence, RI; ³Lifespan, Providence, RI. (Tracking ID #2199178)

NEEDS AND OBJECTIVES: Physician advocacy is becoming increasingly recognized as an important component of medical education. However, few residency programs offer advocacy training, and much of the teaching is about health policy and health systems, with no training for specific skills for physician advocacy such as communicating with media and elected representatives. At Alpert Medical School of Brown University in Providence, Rhode Island, there was no formal physician advocacy training in the Internal Medicine residency program. We designed and implemented a resident-run physician advocacy curriculum for the General Internal Medicine (GIM) residency program.

SETTING AND PARTICIPANTS: Three GIM residents with varied experiences and interest in advocacy initiated the curriculum with support of the GIM residency program director. Starting in 2013, the curriculum was implemented during the ambulatory block month at Rhode Island Hospital for the 10 s year GIM residents. Four cycles of the curriculum have taken place in July and November of the past two years, with approximately five residents participating at a time.

DESCRIPTION: The curriculum is organized into four 90-min sessions facilitated by the curriculum organizers, all of whom are residents. The first session is a discussion surrounding the role of the physician as an advocate. Questions posed during the session include: What is physician advocacy? Do physicians have a duty to advocate and to what extent? How comfortable do you feel with physician advocacy? How can physician advocacy help you take care of your patients? The second and third sessions are dedicated to learning how to write an op-ed or letter-to-the-editor. During the second session, the residents read recent opinion pieces in various news publications and medical journals regarding health care. Then in small groups they systematically critique the articles and discuss why a piece of writing was effective and chosen for publication. At the third session the residents share their own letters and op-eds for critique and feedback. Residents are encouraged to submit these pieces of writing to various news publications. The fourth session focuses on legislative advocacy, specifically how to call an elected representative's office and set up an appointment, how to select and prepare issues to be discussed, and the logistics of follow-up after the visit. We teach residents that their medical expertise, their passion for a specific cause or issue, and their personal stories from clinical encounters are what make their voice distinct and memorable to an elected representative.

EVALUATION: An evaluative component was added in the second year of this curriculum in July 2014 with IRB approval. Our survey uses a 5-point Likert (Strongly Agree/Disagree) scale to measure pre- and post- curriculum changes in attitude regarding physician advocacy and comfort level with advocacy skills. The survey was completed by the July 2014 participants; November 2014 participant results are pending. There were positive changes in the residents' perceived comfort level with working to get policy passed about a healthcare issue ($p=0.005$) and with speaking to the media ($p=0.003$). Residents also responded in a positive direction regarding how likely they were to get involved in advocacy through communicating with elected representatives ($p=0.004$) and writing an op-ed or letter to the editor ($p=0.001$). There was also a positive but not statistically significant change in residents' understanding of opportunities available for physicians to advocate ($p=0.08$).

DISCUSSION / REFLECTION / LESSONS LEARNED: Since July 2013, a total of 21 GIM residents have completed the curriculum. Several of them have published opinion pieces in the local newspaper, and have had multiple meetings to discuss GME and resident workforce issues with Rhode Island Congressman David Cicilline and Senator Jack Reed's staff members. The goal of our curriculum is to teach residents a set of skills so that they feel empowered to engage in health care advocacy through concrete, practical ways that can be integrated into their future careers. We deliberately chose not to incorporate didactics regarding health policy or systems into our curriculum. They leave the sessions with tangible skills and knowledge to write an op-ed and letter to the editor as well as to communicate with elected representatives. Our survey showed statistically significant positive change in residents' comfort in these skills after completing the curriculum. We hope to standardize our curriculum in such a way that it can be taught by residents with limited experience in physician advocacy. Our curriculum lends itself to

replication because it requires few resources, limited training of resident-leaders, and few, if any, funding requirements. The Brown physician advocacy curriculum is simple, resident-initiated, requires few resources and minimal time commitment, and is easily adoptable.

EMPOWERING INTERNAL MEDICINE RESIDENTS TO DISCUSS ADVANCE CARE PLANNING IN PRIMARY CARE CLINIC Jessica Bender¹; Jennifer Russo¹; Irina Vovnoboy¹; Sandhya Rao²; Ryan Chippendale². ¹Boston Medical Center, Boston, MA; ²boston university, Boston, MA. (Tracking ID #2198986)

NEEDS AND OBJECTIVES: Advance care planning in primary care is increasingly important as the population ages, yet internal medicine trainees report lack of confidence and skills in leading these discussions. We conducted a needs assessment and educational intervention to improve the confidence and skills of internal medicine interns in discussing advance care planning in the primary care setting.

SETTING AND PARTICIPANTS: The study was conducted in an urban academic medical center in Boston. Participants included categorical and primary care interns in an internal medicine residency program.

DESCRIPTION: A voluntary needs assessment survey was conducted to assess interns' attitudes about and confidence in leading advance care planning discussions in the primary care setting. Based on this needs assessment, several educational interventions were developed. First, a practice improvement module was created; each intern was asked to perform a chart audit to determine their baseline practice of advance care planning in primary care clinic. Second, based on the results of the needs assessment survey, a one hour, small-group educational session was developed to address areas of lower confidence. After the educational sessions, participants will conduct a second chart audit to determine if their practice has changed. In addition, a post-intervention survey will be conducted to determine if interns' confidence and attitudes have changed.

EVALUATION: The needs assessment survey response rate was 86 % ($n=38$). More than half of the respondents (68 %) had not had formal training in advance care planning during medical school. The majority of respondents (74 %) indicated that advance care planning in primary care is important or very important. However, 45 % reported that they had not facilitated any advance care planning discussions with their primary care patients. Despite this low frequency of advance care planning discussions, interns reported a high level of confidence in discussing advance directives, naming healthcare proxies, and facilitating advance care planning in the ambulatory setting. Interns reported lower confidence (able to perform with distant or close supervision) in estimating prognosis and discussing changes in care needs. The most frequently reported barriers to facilitating ACP discussions were time (87 %), patients with multiple comorbidities (76 %), and provider confidence (42 %). The most frequently reported factors that led to high prioritization of advance care planning were patient age (32 %), functional decline (26 %) and the existence of multiple comorbidities (24 %).

DISCUSSION / REFLECTION / LESSONS LEARNED: This needs assessment survey indicates that participants had high levels of confidence in discussing advance care planning, yet they reported holding very few discussions in the primary care setting. It is possible that interns' high level of self-reported skill is due to experiences they have had in the inpatient setting, where they frequently are responsible for assisting patients in naming healthcare proxies, discussing goals of care, and leading family meetings. The interns' lower confidence in estimating prognosis in the outpatient setting likely results in an underestimation of the number of primary care patients who would benefit from advance care planning. Thus, the goal of the educational session was to increase interns' ability to identify patients who would benefit from advance care planning discussions. To facilitate this, the sessions focused on improving skills in prognosticating and on sharing strategies to overcome other barriers such as time and multiple comorbidities. The aggregate results of the initial and follow-up chart audits are still pending at this time but will be used to determine if this educational intervention results in a change in practice facilitating advance care planning with primary care patients.

ENGAGING HOUSESTAFF IN TEAM-BASED CARE: THE USE OF INTERDISCIPLINARY TEAM MEETINGS IN THE INTERNAL MEDICINE RESIDENCY AMBULATORY EXPERIENCE Jonathan Arend¹; Eva Waite¹; Aparna Sarin¹; Lauren Peccoraro¹; Rachel Solomon¹; Athanasia Vasiliadis¹; Linda Pagan²; Theresa Soriano¹. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Mount Sinai Hospital, New York, NY. (Tracking ID #2199550)

NEEDS AND OBJECTIVES: Amid increasing enthusiasm for team-based models of patient care, incorporation of team-based care into residency curricula is starting to emerge. As academic primary care practices embrace the Patient-Centered Medical Home (PCMH) model and residency programs seek ways to satisfy Next Accreditation System (NAS) milestones related to team-based care, educators must develop methods for

teaching the skills needed to operate effectively in interdisciplinary care teams. As part of a comprehensive PCMH curriculum, we instituted an outpatient interdisciplinary team meeting structure to support team-based care and quality improvement. We sought to determine the feasibility of team meetings, assess their impact on resident satisfaction with interdisciplinary care, and measure the effect of team-based quality initiatives.

SETTING AND PARTICIPANTS: In our academic primary care practice at the Icahn School of Medicine at Mount Sinai in New York, NY, internal medicine residents are assigned to 1 of 3 firms, in which they provide patient care and work with firm-based attending physicians, medical assistants, registered nurses, nurse practitioners, social workers, care coordinators, patient navigators, and front desk registration staff. In July 2013, we implemented weekly team meetings in each firm, attended by members of each of the above disciplines. All residents attended their respective team meeting during ambulatory blocks.

DESCRIPTION: We developed the format of the team meetings based on literature review, collaboration with other academic medical centers, and local priorities. Prior to initiating the meetings, we trained the residents, general internal medicine faculty, and clinic staff in principles of teamwork, effective meeting skills, and quality improvement methodology. We redesigned the resident schedule and clinic staffing to provide 1 h per week of protected time for the meetings. The meetings were co-led by a registered nurse and an attending physician and focused on team communication, clinical workflows, and quality improvement.

EVALUATION: We conducted baseline and 10-month follow-up surveys to assess resident satisfaction with interdisciplinary care at the practice. Sixty-six surveys were returned (51.5 % response rate) for both assessment periods. After implementation of the meetings, resident satisfaction with the practice's team-based functioning increased substantially. The percentage of residents who were very satisfied with the practice's overall team-based functioning increased from 8 to 22. Levels of satisfaction (very satisfied) for components of team-based care, including co-management of patients' medical conditions, communication about patient care, shared responsibility of patient care, and personal support from team members, ranged from 7 to 13 % at baseline and from 17 to 24 % at follow-up. Quality improvement projects developed in the team meetings resulted in sustained improvements in influenza vaccination, clinical depression screening, fall risk screening, blood pressure control, and primary care provider continuity. The regular meeting schedule was maintained without disruption of clinical care, losses in productivity, or significant use of additional funding sources.

DISCUSSION / REFLECTION / LESSONS LEARNED: Weekly interdisciplinary team meetings are a feasible method of introducing internal medicine residents to team-based care and quality improvement in an ambulatory setting. Team meetings have the potential to increase resident satisfaction with team-based care and lead to improved performance on various quality indicators. The role of team meetings in influencing ACGME core competencies or other performance metrics requires further study.

EVALUATING A HIGH VALUE CARE CURRICULUM IN THE AMBULATORY SETTING Brent W. Thiel²; Doris Rubio¹; Peggy Hasley¹. ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2199102)

NEEDS AND OBJECTIVES: The American College of Physicians (ACP) and the Alliance for Academic Internal Medicine (AAIM) have developed a curriculum to promote high value cost conscious care (HVC). However, few studies have evaluated the effectiveness of this curriculum on medical trainees. Our educational objectives are for residents to: (1) align case based knowledge with best practices, (2) identify web resources that report on clinical costs, and (3) reduce self-defined wasteful behaviors.

SETTING AND PARTICIPANTS: Participants are categorical and preliminary internal medicine interns and postgraduate year two residents at an academic, tertiary care medical center. Seventy-seven percent ($n=31$) of categorical interns participated in the intervention. Eighty-three percent ($n=33$) PGY2 for comparison at 6 month follow-up and 38 % ($n=12$) preliminary internal medicine interns for comparison at the pretest, participated as comparison groups.

DESCRIPTION: Our intervention consists of a small group session in which interns are provided brief didactics on health care costs and then work through two cases, on headache and low back pain, to explore the topic of healthcare waste. We adapted materials from ACP/AAIM 2012–2013 HVC Curriculum (modules 2 and 9). The course focuses on the overuse of imaging tests and explores barriers to waste reduction. Small group, interactive discussions focus on guidelines for use of imaging studies, and actual local and national charges for these tests. Interns brainstorm personal, patient, institutional, and system-wide barriers to reducing waste and develop strategies to overcome these barriers. Finally, interns develop individual goals to reduced waste and overcome barriers in their own clinical practice.

EVALUATION: A 29 item, confidential survey was developed to assess knowledge, attitudes, and behaviors relating to healthcare waste. Survey administration occurred pre,

immediately post, and 6 months post the curriculum to categorical interns taking the course, as well as to controls. T-tests for summary scores from each of the three domains were used to compare the effect of the intervention across time, and the difference between the experimental and two control groups at baseline.

DISCUSSION / REFLECTION / LESSONS LEARNED: We found no significant difference in baseline knowledge between controls and pre intervention interns ($p=0.14$). There was also no difference in summary score between controls and pre intervention interns with regard to attitudes ($p=0.18$) and behaviors ($p=0.76$). We found a statistically significant increase in knowledge from the pre-test to the immediate post-test ($p<0.001$) among interns who participated in the curriculum. However, this change was not sustained at the 6 month follow-up ($p=0.29$). Similarly, there was a significant change in attitudes summary score from the pre-test to the immediate post-test ($p=0.003$), but this was not sustained at 6 months ($p=0.65$). Behaviors were only assessed at the pre-test and 6 month follow-up with no significant change noted ($p=0.71$). Our study validates the utility of the ACP/AAIM 2012–2013 HVC Curriculum and brief curricular interventions to increase knowledge and attitudes related to HVC practices immediately following the curriculum, however these changes were not sustained over time. Limitations include: single seminar format, lack of randomization, survey response bias, and incomplete follow up. Although our brief curricular intervention alone did not create a durable change in HVC knowledge, attitudes, and behaviors, this is not surprising given that current models of learning theory underscore the importance of repetition in creating lasting knowledge or behavioral change. Furthermore, this intervention was not designed as a stand alone curriculum, but rather a piece of a larger HVC curricular sea change. Used in tandem with other multi-setting interventions, durability of knowledge and ultimately behavioral change can be achieved. More studies will be necessary to validate other interventions and determine the effect of such curricula on outcomes that directly measure behavioral change.

EVALUATION OF A BRIEF HANDOFF SKILLS WORKSHOP TARGETED AT INCOMING INTERNS Christopher J. Smith²; Michael C. Wadman²; Jeffrey Harrison²; Gary L. Beck¹. ¹University of Nebraska College of Medicine, Omaha, NE; ²University of Nebraska Medical Center, Omaha, NE. (Tracking ID #2181183)

NEEDS AND OBJECTIVES: Poor handoff communication has been linked to adverse patient outcomes and inefficient care delivery. In 2014 the Association of American Medical Colleges identified patient care handoffs as one of their core entrustable professional activities for entering residency. Despite this, few medical schools have handoff curricula and student involvement in handoffs is inconsistent. A recent study showed that a day-long handoff workshop aimed at incoming interns could improve self-reported perceptions, however this intervention did not report on learner skills and time constraints may limit its applicability at other institutions. The objective of our intervention was to improve handoff-related perceptions and skills in a diverse group of incoming interns via a brief, interactive educational intervention.

SETTING AND PARTICIPANTS: We conducted a 1-h handoff training session as part of GME orientation for incoming interns at a large, state-funded academic medical center.

DESCRIPTION: We developed the training session based on published handoff research and pedagogy. The workshop addressed 3 aspects of handoff practice: information transfer, responsibility and accountability, and systems-level elements to facilitate handoffs. The training was comprised of didactic lectures, group discussion, and role-play activities. We conducted two sessions, each with approximately 50 interns and 5 faculty facilitators per session. Throughout the training, we stressed the importance of providing unambiguous follow-up tasks and contingency planning, prioritization of patients, and closed-loop communication. Resident dyads practiced written and verbal handoff skills via vignette-based role-play scenarios with direct faculty oversight. Participants practiced written handoff skills by completing EHR-style templates and verbal handoff skills using a modified SBAR mnemonic.

EVALUATION: We conducted paired pre/post-intervention surveys to evaluate Kirkpatrick Level 2a (attitudes and confidence) and 2b (knowledge and skills) outcomes. Participants rated attitude-based questions using a 5-point Likert scale. To evaluate skill acquisition, learners provided examples of both a follow-up task and contingency plan that might occur during a high-quality handoff. These were scored independently by 2 faculty members based upon a previously established scoring system (0–4 points). We analyzed pre/post-surveys using Wilcoxon Signed-Rank test, with p -value <0.05 considered significant. We also looked for associations between survey results and demographic information, including past handoff experiences. Ninety-nine of 108 interns (91.7 %) completed both pre- and post-surveys. Over 50 % of participants were entering primary care residency programs. Participants reported a wide range of prior handoff training and real-world experiences. There was significant improvement in all 10 attitude-based questions. There was also improvement in the skills application portion of the survey (1.07 to 2.16, $p<.001$). Survey findings were consistent regardless of prior handoff training, number of handoffs observed, or number of handoffs performed.

DISCUSSION / REFLECTION / LESSONS LEARNED: Entering interns must be competent to perform unsupervised patient care handoffs. We show that a brief, evidenced-based educational intervention is effective in improving interns' self-reported knowledge and confidence in performing handoffs, as well as their ability to perform core handoff activities (follow-up tasks and contingency planning). Further work is needed to determine if these improvements translate to clinical practice

FINDING JEMS: DESIGNING LONGITUDINAL LEARNING RELATIONSHIPS INTO RESIDENCY TRAINING Daniel R. Wolpaw; Jennifer Kraschewski; Paul Haidet; Jed Gonzalo. Penn State College of Medicine, Hershey, PA. (Tracking ID #2196300)

NEEDS AND OBJECTIVES: Longitudinal learning relationships are the subject of considerable interest and focus in undergraduate medical education, but it has been challenging to achieve consistent faculty-leader relationships in residency programs. At the same time, the Next Accreditation System has focused on the need for trainees to engage in meaningful reflection as part of a competency-based curriculum. Reflection is a critical component of professional development and lifelong learning, but difficult to achieve in the absence of longitudinal mentoring relationships. In response to this challenge, our Department of Medicine has created the Jeffries Educational Mentors and Scholars (JEMS) program with the following objective: to create a structured program of longitudinal mentoring to advance the personal and professional development of residents through: 1) timely formative feedback, and 2) coaching through cycles of meaningful, individualized professional learning plans (PLPs) based on critical self-reflection and linked to Entrustable Professional Activities (EPAs).

SETTING AND PARTICIPANTS: All Categorical Internal Medicine Residents and Med-Peds Residents ($n=68$) are assigned to a JEMS faculty member ($n=22$) for the duration of their postgraduate training. Faculty are selected based on a competitive application process and provided with 5 % departmental support for participation.

DESCRIPTION: Each JEMS faculty member is linked to 3–4 residents at the same stage of training. Residents are instructed to contact their faculty to arrange a meeting during each of their 2-week ambulatory block segments that occur every 6 weeks. Residents are asked to prepare for meetings by identifying a learning need or “disorienting dilemma,” which is then reflected upon and collaboratively crafted into a PLP at the meeting. Additional discussion may address career planning, feedback (adverse or positive), or exam preparation. Following each meeting, residents send a summary of the meeting and PLP to their JEMS faculty, who respond with additional comments on the conversation and plan. All of these reflections are shared with the medicine residency program administrator.

EVALUATION: Resident-faculty reflections were analyzed using a qualitative content analysis to: 1) identify the content of PLPs being discussed, 2) map these plans to the Internal Medicine EPAs, and, 3) identify additional themes in these conversations. Twenty-eight reflections were evaluated from the first 5 months of the academic year. Common themes for PLPs included: practice-based improvements, high value care, scholarship, personal and career growth, medical knowledge and skills, and quality improvement. The 28 discussions mapped to 13 of 16 EPAs, with the majority mapping to >1 EPA. Most common EPA topics included lifelong learning, quality at the individual and systems level, and transitions of care. Additional themes addressed career options and recommendations and work-life balance.

DISCUSSION / REFLECTION / LESSONS LEARNED: The mid-year program launch in 2013 that was hampered by resident uncertainty of program expectations and the lack of a consistent calendar space for meetings (i.e. prior to the ambulatory block scheduling). However, since July of 2014 the JEMS program has shown evidence of significant acceptance and impact. Measures of success include documentation by residents of faculty-resident meetings and PLP development. We have been particularly impressed by the usefulness of the “disorienting dilemma” trigger and the manner in which PLP efforts map to EPAs. We believe these triggers and plans in the context of a consistent mentoring relationship with dedicated faculty will allow us to promote and assess critical reflection in our residents. We have also noted an increasingly positive response of residents to a longitudinal mentoring relationship based on advocacy for professional growth and formative feedback. Several adjustments have been made to the JEMS program since its inception, most notably: 1) focusing on PLPs rather than specific milestones, 2) locating resident-faculty meetings in the ambulatory blocks and transferring the responsibility for arranging these 1:1 discussions from faculty to residents, and 3) working to create a positive environment of personalized advocacy for professional growth that works synergistically with program leadership. Program evaluation has evolved from general satisfaction and feasibility to focus on the analysis of PLPs. Next steps will include more formal study of perceived impact through focus groups with JEMS faculty and residents and a complete evaluation and mapping of resident-faculty discussions and EPAs. The JEMS program is built on the core educational principles of

continuity in learning relationships and professional learning plan cycles. We believe this approach has great potential for advancing the goals of the Next Accreditation System and the professional development of our residents.

FITTING THE BILL: A QUALITATIVE ANALYSIS OF GROUP REFLECTIONS ON PATIENTS' HOSPITAL CHARGES Tanya Nikiforova¹; Maggie K. Benson¹; Megan Hamm³; Kelly Williams³; Susan L. Zickmund²; Anna K. Donovan¹. ¹University of Pittsburgh Medical Center, Pittsburgh, PA; ²University of Pittsburgh/VA Pittsburgh Healthcare System, Pittsburgh, PA; ³University of Pittsburgh, Pittsburgh, PA. (Tracking ID #2198694)

NEEDS AND OBJECTIVES: Physicians play a crucial role in curtailing health care spending in the US, and yet traditionally residents have received little formal teaching about balancing optimal health outcomes with contained healthcare costs. To address this need, our institution recently implemented an inpatient curriculum involving group reflections on a patient's hospital bill. Previously published similar curricula have mixed results, often showing improvement in resident knowledge of medical costs, but little or no change in ordering practices or patient outcomes. Through open-ended interviews with residents, we sought to examine whether this curriculum elicits discussion of High Value [cost conscious] Care (HVC) principles, leads to improvement in perceived knowledge about costs, and influences residents' reported clinical practice. To our knowledge, this is the first study using qualitative methods to evaluate a bill reflection curriculum.

SETTING AND PARTICIPANTS: This curriculum was implemented for residents rotating through General Internal Medicine (GIM) inpatient services at an academic, tertiary care medical center. Each inpatient GIM team included one attending physician, one second or third year resident, two interns, and several medical students. The reflections occurred within these teams once per month in place of traditional attending didactic sessions.

DESCRIPTION: Attending physicians were oriented to this curriculum during weekly meetings and were asked to submit the name of a patient cared for by their GIM team. They were provided with a bill, which included all itemized charges from their patient's hospital stay. The attendings were also given a reflection guide with discussion questions and resources for how to interpret the bill. There were three main components to the reflection. First, residents were asked to discuss the interpretation of the charges and to consider whether anything in the bill was surprising. Second, residents were asked to consider whether any wasteful or harmful care was provided. Suggested discussion questions included: “Can we find anything on this bill that we feel was wasteful? Or harmful? Did we need all of the tests ordered? Are there less expensive medications that we could have used?” Finally, the team was prompted to formulate an action plan for subsequent patients.

EVALUATION: We conducted semi-structured 10–15 min telephone interviews with residents shortly after the completion of their GIM rotation. Interviews were conducted by two trained qualitative interviewers using an interview guide developed with a qualitative expert. Interviewed residents were asked about: the concepts discussed during the group reflection; how the discussion was useful or not useful; whether their self-perceived knowledge of charges for commonly ordered labs, imaging studies, procedures or medications changed; and whether their self-reported clinical practice changed after the reflection. The interviews were audio recorded and transcribed verbatim. The analytic approach used the Editing method developed by Crabtree and Miller and involved the iterative development of a codebook. Formal thematic analysis is currently underway with preliminary observations presented below.

DISCUSSION / REFLECTION / LESSONS LEARNED: The participation rate was 95 %, with 20 of 21 residents from 7 house staff teams completing interviews. There were 12 PGY1, 5 PGY2, and 3 PGY3 participants. The time spent on the bill reflection varied between teams with an average of 30 min. Residents reported that the curriculum improved their knowledge about medical costs and cited several positive ways in which the bill reflection could change their clinical practice. Residents indicated that this exercise stimulated them to consider whether a test will change their management before ordering it, and most frequently this was applied to ordering daily lab work. For example, one resident stated, “Definitely in terms of daily labs...that's something I've been trying to work on since then, like thinking about ‘are we just ordering this because they're in the hospital or is this actually something that we're going to use?’” Residents also cited limitations of the bill reflection as a tool to change their clinical practice. Most commonly mentioned was the lack of cost information at the time of clinical decision making. Other limitations included difficulty interpreting the actual cost to the patient based on the hospital bill charges, as well as their ordering preferences being limited by expectations of consultant and generalist attendings. The inpatient bill reflection curriculum was a logistically feasible, inexpensive, and brief intervention that led to increased awareness of costs among residents and fostered discussion of HVC principles. Given the residents' favorable response to this exercise, we plan to incorporate elements of the bill reflection into future inpatient and outpatient HVC curricula.

HEALTHCARE BY THE NUMBERS: A PROGRAM TO TEACH DATA SCIENCE TO MEDICAL STUDENTS Lindsay E. Jubelt¹; Ruth Crowe²; Martin Pusic¹; Mark D. Schwartz¹; Marc Triola¹. ¹NYU School of Medicine, New York, NY; ²NYU School of Medicine, New York, NY. (Tracking ID #2198919)

NEEDS AND OBJECTIVES: Healthcare is shifting from one-on-one patient care to population health, in which teams of providers care for a panel of patients. This shift requires a new skill set for doctors, centered on data analysis and technology, to enable provider teams to monitor their entire patient panel, not just those actively seeking care. These skills are not taught in today's medical school curriculum. In response, with funding from the AMA's Accelerating Change in Medical Education Program, NYU introduced a program for its medical students called Healthcare by the Numbers. It has the following objectives: 1. Develop skills to examine data across panels of patients, 2. Teach the strengths and pitfalls of big clinical databases, and 3. Provide insight into how administrative data can be used to measure quality and value in health care.

SETTING AND PARTICIPANTS: The Healthcare by the Numbers exercise occurred within the Practice of Medicine (POM) course at NYU School of Medicine. POM is a pre-clerkship core clinical skills teaching module that encompasses medical interviewing and examination along with cultural competence, medical ethics, health policy, and clinical epidemiology. NYU School of Medicine is located in New York City. It has 1360 Full-Time faculty, 975 residents and fellows, and 4788 Post-Graduate Registrants. The Healthcare by the Numbers participants were 150 first-year medical students, the entire first year medical student body.

DESCRIPTION: Faculty delivered a lecture to the medical students providing an overview of large datasets, population health, and panel management as well as an introduction to the New York Statewide Planning and Research Cooperative System (SPARCS) dataset. Students were assigned to work in pairs to identify and investigate a clinical question or hypothesis, using a SPARCS dataset created specially for the students, and to present their findings to a faculty preceptor. Encouraged elements were: a literature search with references, a data description, cross-tabulations, and graphical visualizations. Students were required to meet with a medical librarian to review their research question and to submit the question for faculty review. Faculty held voluntary office hours and a biostatistician was available to meet with students.

EVALUATION: The evaluation included faculty and student evaluations of the exercise (qualitative and quantitative data), librarian evaluations of student research questions (qualitative data), and faculty evaluations of student presentations (qualitative and quantitative data). We also collected student research questions and are conducting analysis of these questions to identify common themes. All 75 student pairs presented final projects. Example questions include: "Differences in Length of Stay for Hip Surgery based on Payer Type at New York Hospitals" and "Association between Race and Length of Stay for Patients Hospitalized with Schizophrenia."

DISCUSSION / REFLECTION / LESSONS LEARNED: We were able to scale the Healthcare by the Numbers program to an entire medical student class, demonstrating the utility of the program and its tools for a large audience. Students enrolled in the program were able to generate and investigate their own questions using a large dataset. For the future iterations, we plan to develop a faculty-training course to teach faculty preceptors basic concepts of data management and analytics.

ONLINE RESOURCE URL (OPTIONAL): <http://education.med.nyu.edu/ace/>

HONING IN ON INPATIENT ROUNDS LEADERSHIP: CREATION & IMPLEMENTATION OF A NOVEL TOOL TO EVALUATE ROUNDS LEADERSHIP & EDUCATION Lekshmi Santhosh; Sarah Schaeffer; Bradley A. Sharpe. UCSF, San Francisco, CA. (Tracking ID #2199482)

NEEDS AND OBJECTIVES: In internal medicine residencies, the leap from intern year to second year represents a dramatic shift of responsibilities from data-gatherer to team leader and educator. Most residencies have little formal training on this transition and even less direct observation of team leadership skills by new senior residents. The objective of this project was to use a structured tool to enable chief residents to directly observe and evaluate new senior residents on their rounds leadership and education skills: the Rounds Leadership Entrustable Professional Activity (EPA).

SETTING AND PARTICIPANTS: The intervention took place at 3 hospitals across our internal medicine residency program. Participants were new second-year internal medicine residents. Six chief residents shadowed 50 new second-year internal medicine residents on rounds on an inpatient wards day.

DESCRIPTION: We developed a 10-item structured observational assessment to evaluate senior resident leadership behaviors during inpatient morning rounds. Morning rounds involved one senior resident, two interns, one attending physician, and third and fourth year medical students rounding on their list of patients. Items in the observation

were chosen based on behaviors that mapped to an entrustment score for an ACGME milestone and/or represented an institution-specific goal for senior wards residents. Each item was quantitatively scored on a Likert-type scale with qualitative examples and feedback also noted for each. Items evaluated were: 1. Showed enthusiasm for the topic and/or the learner, 2. Showed interest through body language, 3. Created a conducive physical environment for learners, 4. Used learners' names, 5. Set an agenda and managed rounds efficiently, 6. Gave positive and corrective feedback to team members, 7. Made clear and salient teaching points during rounds, 8. Demonstrated empathy and compassion with patients and families, 9. Ensured effective communication with team members regarding patient action plans for the day, and 10. Works effectively with the attending physician (e.g. manages "up" when needed). Chief residents shadowed medical teams, completing the assessment over a 1–2 h period with the team. Each senior resident then received reinforcing and corrective feedback in a 1-h one-on-one debriefing with their chief resident observer.

EVALUATION: Throughout the year, we continually reassessed the evaluation metrics and sought feedback on which metrics best captured rounds leadership and education skills. Resident satisfaction with the Rounds Leadership EPA was unanimous with 100 % of residents finding the structured observation and feedback/debriefing sessions useful.

DISCUSSION / REFLECTION / LESSONS LEARNED: This novel tool enabled near-peer chief residents to provide direct observation, feedback, and debriefing with new internal medicine senior residents on aspects of rounds leadership and teaching. The structured tool not only allowed objective benchmarking data of specific behaviors that promote leadership & education, but also allowed opportunity for free-form reinforcing and corrective feedback on these behaviors. Moreover, the feedback and debriefing sessions also offered additional opportunities to check in and discuss intangible factors such as resident-attending dynamics, team well-being, and specific teaching strategies. Implementation of the Rounds Leadership EPA also provided a novel method of assessment that directly maps to the ACGME milestones.

HOSPITALIST PEER OBSERVATION OF TEACHING LEADS TO CHANGES AND ADOPTION OF NEW TEACHING BEHAVIORS Patrick Rendon¹; Deepti Rao¹; John R. Pierce². ¹UNM Health Science Center, Albuquerque, NM; ²Univ New Mexico, Albuquerque, NM. (Tracking ID #2196732)

NEEDS AND OBJECTIVES: Objective: To enhance the effectiveness of teaching by hospitalist faculty using direct peer-to-peer observation and feedback.

SETTING AND PARTICIPANTS: The Division of Hospital Medicine at the University of New Mexico strives to enhance the quality of teaching by hospitalists. Previous strategies to improve teaching effectiveness utilized by the Division have included disseminating results of resident surveys about effective teaching behaviors by attendings, standardizing rounding times, developing written expectations for teaching attendings, and instituting seminars on effective inpatient teaching. Heretofore, the Division has not utilized direct observation. In an attempt to improve teaching effectiveness, we developed a direct observation exercise for academic hospitalists in order to improve teaching effectiveness.

DESCRIPTION: As opposed to previously published strategies that identify effective teachers or effective behaviors and then use an observation to reinforce desirable teaching behaviors, we chose to adopt a peer-to-peer model with the following assumptions: peer observation followed by non-evaluative exchange would result in adoption of more effective teaching techniques; best practices would emerge and be adopted more frequently, and the quality of teaching by all hospitalists (novice and experienced) would improve. We developed a tool for peer observation of teaching behaviors in 5 domains: learner presentations, team leadership, bedside teaching, professionalism, and other. The tool focused on noting differences and similarities in teaching behaviors. All hospitalists participated, and we asked that each hospitalist complete at least one observation of any colleague during inpatient teaching rounds.

EVALUATION: Over 9 months, 18 observations were completed. Observation periods averaged 91 min (range 60–180). Number of learners present, patients discussed, and patients seen at bedside averaged 2.88, 5.29 and 4.12 respectively. An average of 10.33 behaviors/observation were recorded. Similar behaviors averaged 6.5 and different behaviors averaged 3.83. After the encounter, the observing faculty provided feedback to the observed faculty. Both faculty members noted behaviors that they were planning to adopt or change. Planned changes averaged 1.11 by the observed peer and 1.17 by the observing peer. Suggested subjects for changes included resident involvement, teaching on oral presentations, feedback, use of technology and humor, and how to model behaviors. The most commonly planned change in behavior dealt with organizational or leadership issues (12/41). On an anonymous voluntary survey, hospitalists participating perceived the exercise to be useful in improving their professional development (rated 3.85 on a 5 point Likert scale) and 8/13 (62.5 %) hospitalists who filled out the survey made a change to their teaching style on rounds based on the exercise.

DISCUSSION / REFLECTION / LESSONS LEARNED: Peer-to-peer observations of teaching in the hospital can lead to a collegial exchange of ideas about effective teaching behaviors and may result in more effective bedside teaching. Future directions include assessment of learners' perceptions on improvement of teaching during inpatient rounds, and assessment of the impact of changing teaching behaviors on learners' knowledge, attitudes, or skills during their inpatient rotation.

HOW "INFORMED" ARE GRADUATING STUDENTS IN OBTAINING CONSENT? Audrey L. Tanksley⁴; Jeanne M. Farnan³; Nancy Stewart¹; Sean Gaffney⁵; Vineet M. Arora². ¹The University of Chicago, Chicago, IL; ²University of Chicago, Chicago IL, IL; ³University of Chicago, Chicago, IL; ⁴University of Chicago Hospitals, South Holland, IL; ⁵University of Chicago Pritzker SOM, Chicago, IL. (Tracking ID #2198883)

NEEDS AND OBJECTIVES: AAMC released the Core Entrustable Professional Activities for Entering Residency (CEPAER) as a reference for graduating medical students, and includes obtaining informed consent for tests or procedures as vital skill. There are virtually no assessment methods to define whether graduating students are competent. Our objective was to evaluate graduating medical student ability to obtain informed consent.

SETTING AND PARTICIPANTS: Online module, GME orientation Incoming Interns from Internal Medicine, Surgery, Pediatrics, OB/Gyn

DESCRIPTION: Prior to GME orientation, four specialties participated in an e-module which consisted of pre-survey, webcast with introduction of novel strategy for obtaining informed consent (I.N.F.O.R.M.E.D.), posttest, and post-survey. During GME orientation, participants completed an Observed Standardized Clinical Encounter (OSCE) on obtaining informed consent and were evaluated and given feedback by a faculty observer.

EVALUATION: Objective performance ratings and pre- and post-survey data were used to assess the effectiveness of the curriculum.

DISCUSSION / REFLECTION / LESSONS LEARNED: Eighty-seven (100 %) incoming interns participated (52 % internal medicine, 8 % OB/Gyne, 28 % Pediatrics, and 13 % Surgery). While 83 % of students report having had prior training in obtaining informed consent, less than half (45 %) were satisfied with training, and roughly 1 in 5 reported never obtaining informed consent prior to internship. Overall the experience was well received with 92 % reporting the e-module an effective review of informed consent, 92 % being satisfied with their performance and 95 % reporting this exercise useful to their career. Ninety-seven percent reported that the OSCE was realistic, and 99 % felt the e-module prepared them for the experience. Differences were noted among programs in student ability introduce themselves, create rapport with the patient and show empathy. The strengths of this innovation include being a multispecialty pilot, which included high fidelity simulation and direct faculty observation providing an ability to give immediate objective documentation for Program Directors. Also involved multiple teaching modalities to effectively engage learners. Areas for improvement include validating tools to evaluate actual performance.

HOW ARE YOU PUTTING THIS TOGETHER?: ASSESSING THE DIAGNOSTIC EXPERTISE OF CWRU MEDICAL STUDENTS Jennifer Rabjohns¹; Megan McNamara². ¹Case Western Reserve University, Cleveland, OH; ²Louis Stokes Cleveland VAMC, Cleveland, OH. (Tracking ID #2199010)

NEEDS AND OBJECTIVES: Past studies to analyze the diagnostic reasoning of novices, intermediates, and medical experts have focused primarily on patient charting or presentations after a complete patient encounter. This cross-sectional study aimed to evaluate the diagnostic reasoning of preclinical and clinical CWRU SoM students in "real-time" as they worked through an unfolding, challenging patient case.

SETTING AND PARTICIPANTS: All second through fourth-year University Track CWRU medical students were invited to participate, with a research sample limit of 20 students per class.

DESCRIPTION: Through a literature review and discussion with medical education experts, we developed clinical reasoning milestones spanning from the first year of medical school to intern/resident, focusing on the diagnostic reasoning skills of data collection, hypothesis generation, hypothesis refinement, and hypothesis testing. Using this framework we constructed an electronic questionnaire based on an unfolding clinical scenario, in which we asked students to describe their reasoning after each "reveal" in the patient case. Prompting questions were developed from the framework. Data on demographics and satisfaction were also gathered. We analyzed the qualitative data responses using a framework analysis approach. In an iterative process, both investigators used NVivo qualitative analysis software to independently code, compare, and recode data in order to elucidate themes across and within individual survey responses. The clinical reasoning milestones were used to guide analysis. Definitions of cognitive biases from the Society for the Improvement of Diagnosis in Medicine were used to identify respondents'

potential biases. Chi-2 statistics explored an association between gender and types of diagnostic approaches as well as gender and types of bias.

EVALUATION: Respondents used the diagnostic reasoning approaches of guessing, hypotheticals, and comparing problem representations against illness scripts. There were varying levels of problem representation, as measured by semantic qualifiers; problem representation itself was recognized as an important area for improvement in the CWRU SoM curriculum. Respondents showed potential cognitive biases of overconfidence and anchoring/premature closure as well as several strategies to prevent bias (self-reflection, seeking additional resources, seeking confirmation/validation, continuing to consider alternative diagnoses). Most respondents showed enthusiasm for the survey format, with several offering unsolicited suggestions on how to incorporate it into the curriculum.

DISCUSSION / REFLECTION / LESSONS LEARNED: This clinical decision-making survey was successful in assessing CWRU SoM students' "real-time" diagnostic thinking when presented with a clinical scenario, particularly in the areas of hypothesis generation, refinement, and testing. Students had more difficulty than expected in making problem representations, but articulated a variety of strategies to limit cognitive biases. Student responses also provided valuable insight in clinical reasoning milestones which had been omitted from our original framework, particularly in data filtering/selection and data interpretation, both of which are crucial for accurate problem representation. Overall, this clinical reasoning survey provided a dynamic assessment of students' diagnostic reasoning skills, and it did so in a novel format which students found highly engaging. Refining the clinical reasoning milestones and repeating the survey may provide even more valuable information regarding students' "real-time" diagnostic reasoning skills.

IMPACT OF AN ONLINE SPACED REPETITION-LEARNING MODULE ON RESIDENTS' MEDICAL KNOWLEDGE COMPETENCY Andrei Brateanu¹; Ari Garber⁴; Abby Spencer³; Bruce Spevak¹; Neil Mehta². ¹CCF, Cleveland, OH; ²Cleveland Clinic, Cleveland, OH; ³Cleveland Clinic, Chagrin Falls, OH; ⁴Cleveland Clinic, University Heights, OH. (Tracking ID #2199443)

NEEDS AND OBJECTIVES: 1) To test if an online spaced based learning module can decrease the knowledge gap present at the beginning of the residency training. 2) To compare the online spaced based learning module with the traditional method of electronically delivering the pre-rotation curriculum. Hypothesis: spaced repetition learning will reduce the gap between the residents' medical knowledge and the medical knowledge it is expected they have at the beginning of the outpatient rotation

SETTING AND PARTICIPANTS: *Study Participants* Internal medicine residents at Cleveland Clinic that started the training in July 2014 were offered to voluntarily participate in the study. There were no exclusion criteria. The following information was collected from the resident files: -Age -Gender -Type of medical school (conferring medical doctor (MD) or doctor of osteopathy (DO) degrees), -Place of graduation (United States or international medical graduates) -United States Medical Licensing Examination (USMLE) step 1, 2, Clinical Knowledge (CK) scores -Years since graduation from medical school *Pre-rotation curriculum* The medical topics interns are expected to know at the beginning of the outpatient clinical rotation (1/2 day weekly for 1 year) include: -The diagnosis and management of chronic medical conditions such as hypertension, diabetes mellitus, hypercholesterolemia. -CDC recommendations for immunization. -USPTF screening guidelines.

DESCRIPTION: *Study design* Prospective, randomized controlled study of medical knowledge acquisition in post graduate year one (PGY-1) residents. All residents received access to the Cleveland Clinic Lerner College of Medicine (CCLCM) Learning Center Internet site. Using unique, private logins and passwords, residents are able to open PDF files that include the outpatient rotation curriculum and the reference materials associated with it. Residents were randomized into two groups: -The first group did not receive any further information. -The second group received access to an interactive education delivery system within MOODLE, organized in questions and answers and located on the same CCLCM learning center Internet site. After opening each question residents are asked to self-reflect and decide if they know the correct answer. Upon downloading the correct answer, residents are asked to state if they got the question "right" or "wrong". Subsequently, residents receive automatic e-mails reminding them to review the questions unanswered or answered incorrectly. Any question a resident reported to be incorrect is automatically repeated at shorter time intervals (2 days), when compared with a question where the resident reported a correct answer (4 days). Questions answered correctly 3 times in a row are retired and no longer repeated. Thus, the time required to complete the spaced education program vary depending on each resident's individual performance.

EVALUATION: At baseline, all residents had the medical knowledge tested with questions covering the diagnosis and management of chronic medical conditions, the CDC recommendations for immunizations, and the USPTF guidelines for screening of the general population. We used an electronic audience response system to record the questions and answers. At 3, 6, and 9 months from the beginning of the study, residents

from both groups will have their medical knowledge tested again, with questions similar but not identical with the ones used during the spaced education program, but covering the same topics. We will use an electronic audience response system to record the answers and the results will be compared between the two groups of residents. The background independent variables as well as the examination scores obtained by the internal medicine residents are stored in the department of internal medicine residency program office in a password protected electronic file. Each resident was assigned a unique ID in the database. For the purpose of analysis, the data will be de-identified.

DISCUSSION / REFLECTION / LESSONS LEARNED: Fifty-four PGY-1 residents agreed to participate and were enrolled in the study. Descriptive statistics is used to depict the variables of interest and express them as mean and standard deviation or median and interquartile range as appropriate. Multivariable logistic regression models will be created to compare the intervention group with the control group. Regression models will be adjusted for relevant confounding variables, including demographics (age, sex), medical school (MD vs DO), year of graduation, place of graduation, USMLE scores, years since graduation from medical school. The online spaced based learning modules will be used to increase the residents' medical knowledge prior to starting rotations in other medical areas and subspecialties.

IMPLEMENTING A PROCEDURE BOOTCAMP TRAINING PROGRAM ADDS VALUE BY INCREASING CENTRAL LINE PLACEMENT KNOWLEDGE AND SKILLS Alejandro Diaz; Indhu Subramanian; Linda Okamoto; Mohammed Qazi; Simrat Hansra. Alameda Health System - Highland Hospital, Oakland, CA. (Tracking ID #2197908)

NEEDS AND OBJECTIVES: Central line placement is a fundamental skill acquired during internal medicine postgraduate education. We identified a need for better central line training in our residency program, with a majority of outgoing third year residents citing procedure training as an area requiring improvement. We implemented a structured and interactive central line teaching workshop for our incoming intern class. Our aim was to improve knowledge and confidence in placement of central lines and to maximize patient safety by teaching standardized technique.

SETTING AND PARTICIPANTS: We developed this curriculum for our mid-sized internal medicine residency program (64 total residents per year) based at an urban county hospital. Participants included all incoming internal medicine interns matriculating in the 2014 academic year. The teaching sessions were coordinated and staffed by a combination of senior house staff, chief residents and faculty.

DESCRIPTION: We conducted central line training sessions one half day each week during the first month of the academic year for all incoming interns (primary care, categorical, and preliminary interns were included $n=30$). Training sessions were 3 h in length. Each session was divided into four 20–30 min sections covering the following topics: 1. Orientation to a standardized checklist outlining indications, contraindications, materials needed, and procedure complications. Participants received a card version of the checklist with instructions to place in their badge holders as a portable reference. 2. Interns received sterile technique instruction with a primer on proper sterile procedure followed by supervised gown and glove donning with real time feedback. 3. Ultrasound training with orientation to the use of the machine. Interns then used a practice mannequin to correctly identify structures in the neck. 4. To close out the session, each intern was asked to place a central line on the simulation mannequin while being supervised by a senior resident or faculty member with critique and feedback.

EVALUATION: The pilot workshop required all participants to perform a pre-and post intervention test evaluating general knowledge about central line procedures, indications, contraindications, elements of the central line bundle, basic ultrasound technology, and complications. The workshop was concluded by a brief oral examination. After passing the oral examination each intern received a certification card allowing them to perform a supervised bedside procedure. Data revealed that attendees improved their knowledge of correctly obtaining informed consent (33 vs. 93 % correct pre/post-session) and correct use of the ultrasound probe in inserting central lines (70 vs. 96 % pre/post). Pre-test data showed that interns on average could not name any components of the central line bundle and after the session could name 2 items from the bundle. There was no significant difference before and after the session in terms of knowledge about indications for central lines or labs/ studies to be ordered before and after central line placement. Prior to beginning the workshop, we surveyed all PGY-2 and PGY-3 to assess confidence of residents for performing central lines and knowledge of complications and indications. This historical control data will be compared to the intervention group PGY-1's at the half-way point of the academic year to demonstrate sustained efficacy and improved confidence.

DISCUSSION / REFLECTION / LESSONS LEARNED: The central line training workshop piloted in this study was effective in teaching interns the basic knowledge and skills necessary to perform the internal jugular central line procedure. Further long term data can confirm whether these positive results are sustained. Notably, this pilot

intervention was feasible, addressed an important need and was relatively inexpensive and not resource intensive. Our sessions were well received by the intern class and feedback from senior residents indicated that they desired to go through the workshop as well. Faculty have indicated that the intern class who participated in this pilot workshop was better prepared, identified and collected procedure materials correctly, obtained effective informed consents, and ultimately were more equipped to perform an actual patient procedure under supervision safely. Further analysis could evaluate the long term efficacy of a structured central line training workshop with respect to resident competence as well as clinical outcomes such as resource utilization, central line infection rates, number of central lines placed, adherence to the central line bundle components, and complication rates.

IMPLEMENTING AND EVALUATING A FOUR-YEAR INTEGRATED END-OF-LIFE CARE CURRICULUM FOR MEDICAL STUDENTS

Matthew S. Ellman¹; Auguste H. Fortin²; Andrew T. Putnam¹; Margaret Bia¹. ¹Yale School of Medicine, New Haven, CT; ²Yale University School of Medicine, New Haven, CT. (Tracking ID #2157672)

NEEDS AND OBJECTIVES: Meeting the needs of patients with life-limiting and terminal illness requires effectively trained physicians in general medicine and other specialties who are competent to provide skillful and compassionate care. Despite mandates for end-of-life (EoL) care education, graduating medical students do not consistently feel prepared to provide this care. Diverse factors may contribute to this deficiency, including ineffective teaching strategies, curricula with inadequate content or time, and the effects of the hidden curriculum. Recognizing these challenges, we sought to create a longitudinal, integrated 4-year curriculum to teach EoL care skills at our medical school.

SETTING AND PARTICIPANTS: The curriculum was implemented and evaluated in the 4-year program of studies at Yale School of Medicine. All curricular components were mandatory for each class of ~100 students.

DESCRIPTION: We developed a longitudinal, integrated 4-year curriculum to teach basic competencies in EoL care. Developmental learning objectives informed the selections of a variety of teaching strategies which included: interactive lectures and panel discussions; observations of patient interviews; role plays exercises; online interactive learning modules; problem based interactive and simulation workshops; standardized patient experiences; patient care experiences with written reports and case conferences. The curriculum emphasized experiential, skill building activities with special attention to student self-reflection. In addition, we have incorporated interprofessional learning and education concerning on the spiritual and cultural aspects of care. A dedicated webpage fosters continuity of the curriculum and blended learning features combining interactive online modules with live workshops promote flexibility and interprofessional opportunities.

EVALUATION: A mixed method evaluation of the overall curriculum and selected components included: analyses of student written reflections and questionnaires; our own and the AAMC graduating student surveys; and demonstration of students' competency in palliative care with a newly developed observed structured clinical examination (OSCE). Student written reflections demonstrate a high level of meaningful learning engagement. For example, a content analysis of 121 third year student reports from the third year component, *Evaluating and communicating with a patient facing EoL*, demonstrated important themes characterizing the learning impact, including: (1) recognition of the complexity of patients' reactions to dying; (2) appreciation of the value of the clinicians' presence. An analysis of interprofessional student reflections from another component, *Spiritual and Cultural Aspects of Palliative Care and the Interprofessional Team*, indicated that students recognized important issues beyond their own disciplines, the roles of other professionals, and the value of team collaboration. Our graduating student surveys demonstrated that students graduating in 2011 who participated in the full curriculum felt more prepared in many domains of EoL care than those graduating in 2004–2007 who did not. Results from the AAMC questionnaire of 2013 graduates demonstrates favorable student perceptions of the EoL and Palliative Care curricula at our school compared with the composite of other schools, e.g., 92 % of Yale and 79 % of other medical school graduates felt that their instruction was adequate in palliative care and pain management, while 4 % of Yale and 19 % other graduates felt it was inadequate. The 95 third year students who completed the palliative care OSCE in 2014 had a mean score of 75 % on the 16 palliative care history items indicating overall competency in history and communication for the class.

DISCUSSION / REFLECTION / LESSONS LEARNED: A number of features characterize this EoL care skills curriculum. The developmental stage of the students informs the learning objectives and teaching strategies in each year of the curriculum. To mitigate the effect of the hidden curriculum, EoL sessions are integrated into the clinical clerkships. We placed special emphasis on student reflection; the self-awareness it can foster is important in helping students overcome discomfort and fears about EoL care. We incorporated attention to the often neglected cultural, spiritual and interprofessional

aspects of palliative and EoL care. A dedicated website housing learning resources, online modules, and faculty contact information promotes continuity over the four years. A 4-year longitudinal integrated curriculum enhances students' skills and preparedness in EoL care. As faculty resources, clinical sites and curricular structure vary by institution, proven and adaptable educational strategies will be useful to address the mandate to improve EoL care education. Teaching strategies and components of this curriculum can be adapted to other programs.

ONLINE RESOURCE URL (OPTIONAL): <http://palliativecare.yale.edu/>

INNOVATIVE CURRICULUM FOR SECOND YEAR HARVARD-MIT HEALTH SCIENCES TECHNOLOGY STUDENTS: IMPROVING CLINICAL SKILLS WITH VOLUNTEER PATIENTS GIVING IMMEDIATE FEEDBACK Nadaa Ali¹; Christine Chung¹; Hamed Nayeab-Hashemi³; Derek Monette¹; Stephen Pelletier²; Helen M. Shields¹. ¹Brigham and Women's Hospital, Boston, MA; ²Harvard Medical School, Boston, MA; ³David Geffen School of Medicine at UCLA, Los Angeles, CA. (Tracking ID #2191717)

NEEDS AND OBJECTIVES: The Association of American Medical Colleges (AAMC) report on Learning Objectives for Medical Student Education in 1998 emphasized skillful communication with patients and their families as an important learning objective in medical school. The objective of this education initiative was to improve communication skills by using volunteer patients to give immediate feedback.

SETTING AND PARTICIPANTS: For the 2014 Introduction to Clinical Medicine (ICM) course, we created an innovative curriculum to prepare Harvard-MIT Health Sciences Technology (HST) students in the MD program using "real" patients from the new Brigham and Women's Hospital Volunteer Patient Teaching Corps. These patients "role-played" their real life experiences and gave immediate feedback on students' communication skills. Patient volunteers were identified, and clinical scenarios customized to reflect their health care experiences.

DESCRIPTION: Scenarios ranged from delivering a cancer diagnosis to discussing medical mistakes, voluntary organ donation, and coronary artery disease with myocardial infarction in a young man, along with discussion of nursing home placement with the family of a patient with worsening Alzheimer's disease or with an incapacitating stroke. Resident and faculty teachers were recruited to facilitate the interaction between patient volunteers and students and to give additional feedback. A total of 32 students were randomly divided into two groups. Group A participated in the workshop in week 11 of ICM; Group B participated in week 12. Each group was further divided into teams of 4 students. Each Teaching Team, composed of a resident or faculty teacher and patient, reviewed the case, objectives/goals, and teaching points prior to the workshop. Each of the 4 clinical scenarios lasted 18 min. The clinical scenario was taped to the door for students to read prior to entering the room. For week 11, we assigned each student a role. After anonymous student feedback, we modified the exercise to give each student an active role in the exercise and removed the passive roles of timekeeper and scribe. After each student role-played the part of the doctor, patients gave direct feedback on communication skills, supplemented by observations and recommendations from the resident or faculty teacher. Overall, each student had an opportunity to actively communicate in 50 % of the clinical scenarios.

EVALUATION: All of the students ($n=32$) completed an anonymous written survey with a 100 % completion rate. Overall, the two exercises combined were rated as excellent (on a Likert scale of 1 to 5 with 1 being excellent and 5 being poor) with a mean score of 1.468 (S.D. 0.621). The utility of real patients as teachers of communication skills received an overall excellent mean score of 1.218 (S.D. 0.608). Verbatim qualitative comments included: "Great cases, real patients, felt real," "Amazing! Please keep and expand," "I love the feedback at the end." At the end of the HST course, 21 of 27 students gave the workshop a perfect score of 1 on the Likert scale.

DISCUSSION / REFLECTION / LESSONS LEARNED: An innovative second year student HST communications exercise received an overall excellent rating from the students. Immediate feedback from volunteer patients was the most highly praised and rated aspect of the exercise. We look forward to expanding the use of the Volunteer Patient Teaching Corps at HST and Harvard Medical School as a unique and powerful educational resource.

INSPIRING MEDICAL STUDENT CAREER INTEREST IN PRIMARY CARE FOR VULNERABLE POPULATIONS THROUGH THE DEVELOPMENT OF AN UNDERSERVED MEDICINE CURRICULUM IN THE DENVER HEALTH LONGITUDINAL INTEGRATED CLERKSHIP (LIC) Mim Ari²; Jennifer Adams¹. ¹Denver Health, Denver, CO; ²Denver Health and Hospital Authority, Denver, CO. (Tracking ID #2188715)

NEEDS AND OBJECTIVES: Inspiring and maintaining interest in primary care amongst trainees, specifically for underserved populations, is a significant challenge.

Students participating in LICs are more likely to understand challenges and rewards of working in a safety-net system, are more likely to view caring for the underserved positively, and thus are more likely to ultimately practice in urban underserved settings.^{1,2} Students develop authentic roles in clinical settings and are given ample opportunity to care for patients with undifferentiated symptoms through transitions in care. This supports the development of a broad view of disease, a strong sense of patient-centeredness, and a nuanced understanding of health care systems^{3, 4}; skills and knowledge that are paramount to primary care. Through the creation of an LIC at Denver Health, an academic urban safety net hospital system, we aim to demonstrate that students develop not only specialized skills in caring for an urban underserved population, but sustain/increase career interest in primary care for vulnerable populations. To support this goal, we have developed a longitudinal Underserved Medicine curriculum that consists of small group didactics and workshops woven into the core clinical curriculum.

SETTING AND PARTICIPANTS: The Denver Health LIC's inaugural class includes eight University of Colorado third year medical students. Students spend the majority of their third year working with ambulatory preceptors in eight core specialties on a weekly basis and meet clinical competencies across multiple disciplines simultaneously. Students participate in weekly didactics, which include the sessions dedicated to the Underserved Medicine curriculum.

DESCRIPTION: The Underserved Medicine curriculum focuses on interactive, patient-related learning opportunities. Sessions include: A community survey in which students explore the neighborhoods surrounding the community health centers where they work with preceptors. Students present a photo essay that documents access to health care, food, parks and recreation, transportation, and safety issues. A workshop describing quality and safety initiatives within the health care system with particular focus on improving these measures for vulnerable populations. Quarterly reflective writing assignments in which students reflect on access to care, poverty, social determinants of health, and appropriate professional boundaries, and then meet as a group to share experiences and insight with faculty facilitators. An experiential clinical nutrition assignment in which students identify a patient with nutritional needs (obesity, diabetes, etc.) and attend a nutrition-centered activity with the patient. Examples include grocery shopping with a dietician and group weight loss visits. A case-based workshop on providing high value care and balancing cost and quality in a safety net setting, highlighting issues such as use of generic medications, utilizing the Choosing Wisely lists, and discussing the minimization of low value care with patients. A workshop on supporting transitions in care from the inpatient to primary care setting for patients with limited resources (working phone, transportation, co-pays, etc.). A workshop on health literacy demonstrating how physicians can assess literacy level and improve outcomes and communication for patients with low health literacy.

EVALUATION: Medical students participating in the Denver Health LIC provide written evaluations for all didactic sessions, give feedback through mid-course and end-of-year evaluations, and participate in semi-structured focus groups. The entire third year class, including the LIC cohort, will participate in a career interest survey at three points during the year with questions about interest in primary care and working with the underserved.

DISCUSSION / REFLECTION / LESSONS LEARNED: The Denver Health LIC is uniquely based in an urban safety net hospital system, and presents an opportunity to highlight challenges and rewards in providing primary care to underserved populations. Students have been engaged and thoughtful about the curriculum based on early evaluations of the didactics and reflection sessions. Incorporating data based on year-end evaluations of this curriculum and the career interest survey, we hope to show that the underserved medicine curriculum has sparked student interest in primary care careers working with underserved populations. Aspects of this curriculum could be easily exported, as either single activities or as part of a more comprehensive LIC or traditional internal medicine curriculum, to inspire or strengthen career interest in primary care for vulnerable populations among medical students.

INSTITUTING A FLEXIBLE CAP AND FRONT-FILL SYSTEM FOR GENERAL MEDICINE INPATIENT TEACHING SERVICES AT A TERTIARY ACADEMIC MEDICAL CENTER Youngjee Choi; Daniel Kim; Hyemi Chong; Christopher Mallow; Jason Bill; Melvin Blanchard. Washington University School of Medicine, Saint Louis, MO. (Tracking ID #2179188)

NEEDS AND OBJECTIVES: Academic inpatient medicine has multiple competing objectives, including patient care and resident education. With duty hour restrictions limiting resident work hours, a good work flow with a steady stream of admissions on call days is necessary to balance both these objectives. At many large academic internal medicine programs, a main barrier to achieving efficient work flow is the bolus of admissions at the end of a call day. This work compression affects patient care and resident education as residents try to leave call in a timely manner.

SETTING AND PARTICIPANTS: In a tertiary academic medical center with a large internal medicine training program, a flexible cap system along with a "front-fill" mechanism was implemented in the second quarter of the academic year for general ward

teaching services. The physicians on a general ward team include one attending, one upper level resident, and two interns. The call structure is a traditional call cycle with long call every 4 days. On a call day, two teams admit new patients from 7 am to 7 pm. The maximum number of new admissions on a call day are five patients per intern.

DESCRIPTION: The flexible cap system involved allowing interns 90 min to work up each patient from 3 pm to 7 pm on call days. This time period was selected based on resident feedback about work compression and a large number of admissions late in the call day. An upper level resident triaged all of the potential new admissions for the two call teams to ensure 90 min was allotted per patient for each intern. If no intern was available for an additional admission (i.e., within the 90-min window), the admission was reassigned to the non-teaching hospitalist service. Each call team also received two patients admitted by night float at the beginning of call (front-fill) to help ensure a full cap of patients on call. If teams did not achieve the cap of ten new admissions during the call day, they could receive up to three additional patients from night float on the post-call morning.

EVALUATION: Before beginning an inpatient ward rotation with the flexible cap and front-fill system, residents were surveyed regarding their view of the inpatient ward service from prior experience. The same residents were resurveyed after their inpatient experience with the flexible cap and front-fill system. Forty-two eligible residents were surveyed before and after implementation of the new system. Responses from the 33 residents (78.6 %) who completed both the initial and final survey were analyzed. After implementation of the flexible cap and front-fill system, the percentage reporting their workload was not manageable on the inpatient ward fell from 33.3 to 3.0 % of residents ($p<0.0001$). Similarly, while 36.4 % of residents felt that they could not see their patients in a timely manner when assigned an admission in the old system, only 6.1 % of residents expressed this concern with the new call changes ($p<0.0001$). The percentage of residents who felt they had adequate time to spend with their patients rose from 39.4 to 97.0 % ($p<0.0001$), and those that reported they had time to learn from their patients also increased from 48.5 to 87.9 % ($p<0.0001$). In addition, residents who reported they were able to leave on time from call days rose from 31.3 to 81.8 % ($p<0.0001$). Overall satisfaction with the inpatient ward experience rose from 69.7 to 87.9 % ($p=0.0060$).

DISCUSSION / REFLECTION / LESSONS LEARNED: Instituting a flexible cap and front-fill system to allow for a better flow of new admissions can have many positive effects on an internal medicine residency program. With this novel modification to the call structure, internal medicine residents at a large, tertiary academic medical center reported improvement in their education, workload, and time spent providing patient care, with an overall higher rate of satisfaction with their inpatient ward experience.

INTERNISTS, PHARMACISTS AND PSYCHOLOGISTS ON TEAMS, OH MY! AN INTERPROFESSIONAL EDUCATIONAL EXPERIENCE IN GRADUATE MEDICAL EDUCATION Steven Bishop; Allison E. Phillips; Bennett Lee; Sarah Hobgood; Brigitte L. Sicut; Emily Peron; Andrea Garoway; Bruce Rybarczyk. Virginia Commonwealth University, Richmond, VA. (Tracking ID #2196116)

NEEDS AND OBJECTIVES: Interprofessional education and collaboration is critical to medical education and practice and is being increasingly integrated into undergraduate medical education. While graduate medical education (GME) trainees do interact with pharmacists and psychologists to complete parallel patient care activities, they rarely collaborate to learn from one another. Growing out of an interprofessional outpatient residency clinic where pharmacists, psychologists and physicians manage shared patients, our institution developed a series of team-based learning (TBL) activities with learning teams composed of medical residents, pharmacy residents, and clinical psychology graduate students. We describe the development and evaluation of an interprofessional education (IPE) TBL module on depression, delirium and dementia in the geriatric patient. At the end of this TBL, we expected learners to be able to do the following with respect to geriatrics patients with delirium, dementia and depression: 1. Assume responsibility as a provider for developing a non-biased attitude towards patients. 2. Embrace and recognize the necessity of a team-oriented approach toward patients. 3. Recognize risk factors for delirium, dementia, and depression in geriatric patients. 4. Differentiate between delirium, dementia, and depression in geriatric patients. 5. Recognize the utility of common practice tools for assessing patients with these syndromes (e.g., CAM, Mini-Cog, GDS, and PHQ-9). 6. Assess a dementia and delirium management plan for effectiveness, tolerability, and safety.

SETTING AND PARTICIPANTS: Participants included 44 medical residents, 9 pharmacy residents and 10 psychology graduate students in a single TBL session.

DESCRIPTION: The TBL module was developed collaboratively by faculty from all three disciplines. To prepare for the module, facilitators sent participants pre-reading assignments in advance (preparatory work). Readings consisted of guidelines or review articles. Facilitators ensured all teams included at least one pharmacy and one psychology trainee. During the session, teams completed a quiz on the reading, first individually and

then as a team, (readiness assurance test), followed by facilitated discussion of interactive cases requiring complex patient care decisions (group application exercises). Each case was constructed to require input from all professions in order to develop an appropriate answer.

EVALUATION: At the conclusion of the session, learners assessed, on a 4-point scale, with 1=never, 2=sometimes, 3=often and 4=always, their likelihood of developing team-oriented attitudes, performing team-based tasks related caring for patients with common geriatric syndromes, and applying new medical knowledge. The first two response levels 'never' and 'sometimes' were combined due to small numbers reporting 'never' to any of the survey items. The survey asked learners to assess their abilities both before and after training (retrospective pre-post design). Responses expressed with decimal points were rounded up to the nearest whole number. Wilcoxon signed-rank tests were used to determine if mean differences between pre- and post-test scores were significantly different from zero. Generalized estimating equations were used to determine how profession and gender affected participant responses. All survey questions had a statistically significant increase in mean score between the pre- and post- assessment ($p<0.0001$). The largest increases were seen in the knowledge application questions related to the likelihood of: recognizing the utility of practice tools (0.88), assessing a dementia and delirium management plan (0.77), and recognizing risk factors for the co-development of depression and dementia (0.77). Reported scores differed by gender with women reporting higher scores for all tasks in the pre- and post- survey compared to men. Profession also influenced scoring, with psychology learners more likely to report higher scores than medical residents in both the likelihood to embrace a team oriented approach toward patient care and recognizing the utility of practice tools. Lastly, pharmacy residents were more likely to report higher scores in their likelihood to assess a dementia and delirium plan as compared to medical residents. All of these results were significant at the $\alpha=0.05$ level.

DISCUSSION / REFLECTION / LESSONS LEARNED: This IPE TBL experience in GME appears to have had a positive effect on all learners, with increases not only in perceived knowledge of common geriatric syndromes but also in attitudes toward team-based care. The data appear to show disproportionate benefits for non-physician participants as far as changes in team-based attitudes. TBL is a potentially powerful way to leverage interprofessional learning experiences; however, the module did take significant time to plan and implement (approx. 10–15 h of planning). Further study is needed to determine if changes in attitudes seen here are sustained and if they lead to actual changes in team-oriented behavior.

MEDICAL STUDENT LEADERSHIP TRAINING IN HEALTH DISPARITIES THROUGH COLLABORATION WITH NON-ACADEMIC ORGANIZATIONS: WHAT DO COMMUNITY-BASED ORGANIZATIONS VALUE? Brent C. Williams¹; Patricia Mullan¹; Joy Williams²; Andy Haig¹; Senait Fisseha¹. ¹University of Michigan, Ann Arbor, MI; ²Medical University of South Carolina, Charleston, SC. (Tracking ID #2195511)

NEEDS AND OBJECTIVES: Addressing health disparities requires collaboration among different types of organizations such as academic institutions, non-profit social service organizations, and community groups. Adult learning theory suggests that skills in collaborative program development are best learned through practical experience with reflection. However, developing meaningful field experiences for medical students is challenging. To plan the future of a partnership program between community-based organizations (CBOs) and medical students, we sought to determine what aspects of short-term collaboration with medical students were most valued by CBOs.

SETTING AND PARTICIPANTS: In 2013–14, the 34 second-year medical students participating in the co-curricular Global Health and Disparities Path of Excellence at the University of Michigan partnered in teams of 2–4 students with 9 CBOs. A total of 9 CBOs focusing on underserved populations had been recruited during the previous year. Students self-selected into teams for 7 of the 9 pre-identified CBOs; 2 additional projects run by students were accepted as CBO-equivalents. CBOs included 5 community clinics, a social service agency for urban girls in poverty, a school-based clinic network, a public school, and pediatricians' offices instituting enhanced mental health services with UM faculty.

DESCRIPTION: Students and CBOs created and implemented a small project over a 7 month period. The only requirements were that the projects: a) include meaningful participation by students in design and execution, b) be of value to the CBO or its constituents, and c) require a maximum of about 4 student-hours per month over 7 months. At the end of the academic year students presented their work to the CBOs and to each other. At the completion of the projects CBOs completed 5 Likert-type and 3 free text questions regarding the students' behavior and level of engagement, the value of the program to the CBO ('what worked well?'), and suggestions for change.

EVALUATION: Seven of the 9 projects were viewed as complete by the students and CBOs. Two were not completed due to communication or expectation gaps between

students and their CBO liaisons. One project required substantial unexpected work in obtaining security clearances for the students. Eight of the 9 CBOs 'Agreed' or 'Strongly Agreed' that the medical students were communicative and respectful, and had identified a project helpful to the organization. 7 CBOs reported that the students communicated the results of the project to their constituents, and included a plan for continuation of the project. In addressing 'what worked well', CBOs described students' enthusiasm, efficiency, and interest in the CBO; and having a concrete project (rather than observation). The only suggestion for improvement, voiced by 4 CBOs, was that more time be available for the projects.

DISCUSSION / REFLECTION / LESSONS LEARNED: Student-community partnerships can provide crucial opportunities for students' to learn and apply skills in organizational leadership to ameliorate health disparities. From CBOs' perspective, our results are encouraging - organizations responded positively to short-term collaboration with pre-clinical students. In particular, CBOs were uniformly supportive of having students participate in creating new projects rather than merely implementing ongoing projects, a key factor in students' enthusiasm and leadership skills development. Success factors likely included: a) establishing relationships and expectations with each CBO prior to the program, b) setting boundaries with students and CBOs on expected time commitments by students, and c) requiring projects to be of demonstrable and immediate value to the CBOs. Challenges relate primarily to sustainability, and include the substantial time and effort required by the medical school to create and maintain relationships with a large number of CBOs, and (we speculate) enthusiasm of the CBOs in volunteering their time year after year to short-term projects with successive cohorts of students. Strategies for long-term success likely include: a) securing adequate faculty time for CBO liaison work, b) involving individual CBOs less than yearly, and c) protecting curricular time for students' longitudinal engagement in the community.

MUSKULOSKELETAL ULTRASOUND: AN INNOVATIVE APPROACH IN ENHANCING INTERNAL MEDICINE RESIDENT EDUCATION
Padmanabhan Premkumar; Jason Jacob; Cunegundo Vergara; Robert Gionfriddo. Hartford Hospital, Vernon, CT. (Tracking ID #2200275)

NEEDS AND OBJECTIVES: Needs: – Handheld ultrasounds and their clinical utility are well-documented in critical care and emergency medicine. No formal RRC (residency review committee) mandate for ultrasound curriculum in internal medicine residency programs exists, and most internal medicine residency programs have no formal process that integrates office-based ultrasound into ambulatory rotations or continuity clinics. Kessler et al¹ clearly demonstrated the lack of ultrasound training or availability amongst internal medicine residents and medical students. Moreover, our survey with Gronski et al² of 100 residents showed lack of confidence with basic ultrasound techniques, but expressed the need and importance of ultrasound training during residency. -In our hospital-based internal medicine residency clinics the breadth of common musculoskeletal (MSK) complaints has created a need for an alternative diagnostic/therapeutic approach. We clearly see a need to augment the clinical evaluation with ultrasound imaging techniques to enhance resident education, skill sets, and patient care. **Objectives:** – Implementation of a formal ultrasound curriculum aimed at teaching basic diagnostic and therapeutic skills for common ambulatory musculoskeletal conditions - Incorporate office-based ultrasound into the ambulatory block rotation and continuity clinics for real-world application to common MSK conditions as an alternative modality to the traditional diagnostic and therapeutic approach—Create a novel evaluation process for ultrasound proficiency through live peer-to-peer demonstrations in the classroom using pre and post tests -Discuss challenges in the implementation of office-based ultrasound

SETTING AND PARTICIPANTS:—Our primary participants will include 3-year categorical internal medicine residents (Allopathic/Osteopathic) from University of Connecticut Health Center during their Ambulatory Core Rotations. Overall, the residency program has approximately 14 weeks of dedicated Ambulatory experience over the course of 3 years - Residents are instructed through classroom didactic sessions and hands-on training at Hartford Hospital, one of the three major clinical sites for the residency program of University of Connecticut - Residents will perform ultrasound principles at their continuity clinics and/or during their ambulatory block rotations, under the supervision of formally trained MSK ultrasound faculty

DESCRIPTION: Internal medicine faculty, trained in use of office-based ultrasound, provide hands-on training and didactic education over two 3-h sessions during each ambulatory block rotation. Classroom didactics include principles of ultrasound, joint anatomy, and injection techniques using power point/video session. Residents apply and practice the aforementioned principles on each other during the hands-on and interactive portion of the session. Joint protocols devised from AIUM (American Institute of Ultrasound Medicine) will be used as standard of care for joint specific exams. During the ambulatory block rotation, residents work with MSK-trained faculty in providing diagnostic and therapeutic ultrasound-related interventions for common ambulatory MSK conditions.

EVALUATION: To evaluate the basic understanding of ultrasound centered diagnostic and therapeutic skills we will have the residents complete pre and post- tests with each session. We will have our residents participate in virtual diagnosis sessions using common ultrasound images of basic pathology. In addition they will be required to perform various ultrasound guided joint protocols as a tool to evaluate their overall progress in conjunction with MSK trained faculty.

DISCUSSION / REFLECTION / LESSONS LEARNED: We see ultrasound as a novel clinical tool to help improve management of musculoskeletal pain. Ultrasound serves as an alternative to conventional examination and blind injection technique for common musculoskeletal problems. As a diagnostic modality, ultrasound provides a safer therapeutic intervention and serves to enhance resident education by offering a diverse primary care experience. Long wait times and limited access to pain management centers for management of common MSK conditions has increased the demand for primary care physicians with unique skills sets. We have found that MSK ultrasound intervention will be of benefit for patients who are poor surgical candidates due to multiple co-morbidities and/ or deconditioning. In addition, our residency program survey revealed 96.9 % residents favored ultrasound training as part of their IM curriculum. Residents have expressed through feedback marked increase in confidence with regards to use of ultrasound and dealing with primary MSK complaints post initiation of our curriculum. Major challenges to creation of ultrasound based curriculum include faculty training, procurement of resources (ultrasound technology) and incorporation of ultrasound in resident run clinics.

NEW APPROACHES TO COLLABORATIVE LEARNING AND PRACTICE FOR MEDICAL AND NURSING STUDENTS DEVELOPING PAIN MANAGEMENT SKILLS Jeanne Erickson²; Valentina Brashers³; Jennifer R. Marks¹; John Owen³. ¹USC, Glendale, CA; ²UWM, Milwaukee, WI; ³UVA, Charlottesville, VA. (Tracking ID #2199421)

NEEDS AND OBJECTIVES: Ineffective pain management remains a serious public health problem for millions of people. The knowledge and skills of health care providers related to pain assessment and management strategies are often lacking, due in part to insufficient content devoted to the topic of pain in health professions schools. To address these gaps in knowledge and skills in health care professionals, the 2011 Institute of Medicine Report recommended that curricula of medical and nursing schools offer standardized content related to pain management and that students have opportunities to learn about pain management in interprofessional (IP) settings. As IP approaches are fully integrated into health professions schools, a vital component linked to the success of any IPE activity is the initial preparation and continuing support of faculty. Most faculty members are familiar with traditional "uni-professional" education and have relevant knowledge and skills which are more aligned with a didactic teacher role. However, different knowledge and skills are required to be an effective IPE facilitator. Little empirical evidence for the impact of IPE faculty development on student learning outcomes exists to date. **Objectives:** 1. Describe an interprofessional approach to teaching pain management content to medical and nursing students. 2. Examine reasons why interprofessional learning outcomes related to pain management may be different across professions. 3. Develop methods of training faculty to facilitate interprofessional teaching.

SETTING AND PARTICIPANTS: A total of 307 medical and 169 nursing students attended a case-based pain management workshop in 2013 and 2014. The students worked in small groups (either uniprofessional or interprofessional) with and without a mentor (traditionally trained or IP trained) to solve two unfolding case studies - a cancer-related pain case and a post-operative pain case.

DESCRIPTION: Case development. We developed two unfolding case studies that included components of the IASP Interprofessional Pain Curriculum Outline for the workshops. For each case, we identified learning objectives and performance behaviors that covered the domains of the IASP guidelines, and we developed a series of questions in each case for students to respond and apply their knowledge about pain assessment and management. Faculty development. We recruited faculty from the Schools of Medicine and Nursing to be mentors for the student learning groups. The IP faculty development sessions, which included an overview of IPE core competencies as well as a video demonstrating IP facilitation followed by discussion, were led by two faculty with extensive IP faculty development experience. Pain Management Workshops. Two 3-h workshops were held. We randomly assigned students to be in a uniprofessional or IP group of 6-8 students. The groups completed the first pain management case without mentoring and recorded their answers electronically. Faculty mentors then joined the student groups as previously assigned to facilitate completion of the second case.

EVALUATION: Development of scoring checklists. In order to assess and compare learning outcomes between student groups, the collaborative care best practice plan formed the basis of a scoring checklist for interprofessional pain management skills for each case. Scoring checklists were developed to assess and compare learning outcomes between groups.

DISCUSSION / REFLECTION / LESSONS LEARNED: 1. Interprofessional (IP) care is critical for effective pain management, but evidence is lacking about the best way to teach pain management skills to medical and nursing students using IP strategies. 2. The checklist scores for both cases suggest that these students were most competent to perform assessments of the patient's pain. 3. Unprofessional groups of medical students without facilitation had the lowest rubric scores of all student groups for both cases, reflecting their basic understanding of pain management principles at this point in their curriculum where they have not yet had many opportunities for clinical learning to apply their knowledge. 4. For medical students, having IP mentorship of their group and being in an IP group with nursing students significantly improved their scores. These findings suggest medical student competency does improve with IP training. While findings show that IP mentorship and working in IP student groups both improved medical students' abilities to create a comprehensive pain management plan, this improvement was not seen in nursing student performance. Differences in learning across professions are common, and refinements need to be considered in order to achieve optimal learning outcomes for all students. 5. The results of this study showed that mentors with IP training did not significantly improve the pain management competency scores of IP groups. This facet of the study underscores the need for further exploration of optimal ways to train faculty to teach IP learners.

OUTPATIENT ROOT CAUSE ANALYSES—AN INTERPROFESSIONAL CURRICULUM TO TEACH PATIENT SAFETY David Margolius^{2, 1}; Krista Gager¹; Bridget C. O'Brien³; JoAnne Saxe³; Maya H. Dulay^{1, 2}. ¹San Francisco VA, San Francisco, CA; ²University of California San Francisco, San Francisco, CA; ³University of California, San Francisco, San Francisco, CA. (Tracking ID #2195315)

NEEDS AND OBJECTIVES: Educating healthcare trainees in patient safety is imperative for promoting the Culture of Safety and expanding a workforce primed and able to redesign the healthcare system to reduce medical errors. Root cause analysis (RCA) is a patient safety tool used to elucidate the individual and system factors that contributed to an error or near miss. Our goal is to teach patient safety skills in an interprofessional outpatient setting through a curriculum that facilitates each trainee participating in an RCA exercise. Our learning objectives include ability to: identify safety problems in ambulatory settings, distinguish between individual and systems factors, and focus error prevention towards improving processes and systems.

SETTING AND PARTICIPANTS: The San Francisco VA Medical Center (SFVA) is one of five VA Centers of Excellence in Primary Care Education (COEPCE), an interprofessional, team-based training program of which patient safety and quality improvement are core components. Since 2011, 56 internal medicine residents and 15 adult gerontology nurse practitioner students with continuity clinic in SFVA primary care clinics have participated. Our primary care clinics are organized in the VA medical home model called Patient Aligned Care Teams (PACT). Physician and NP faculty and quality and safety chief residents facilitate the RCA sessions.

DESCRIPTION: RCA facilitators email trainees an overview of the RCA activity including a worksheet to complete which guides them through the RCA process. Trainees are paired together (members of the same PACT team when possible) and asked to choose a case of a medical error from their own primary care clinic experience that led to an adverse event or "near miss". With at least 2 weeks lead-in time, the pair, with support from RCA facilitators, reviews the chart for the chosen case and interviews involved healthcare personnel. Each trainee pair presents the timeline of the case and leads an interactive discussion analyzing the factors that contributed to the error(s) and potential solutions in a 1-hour session. Two to three pairs present per session. Faculty ensure learning objectives are met during the discussion and communicate some of the proposed solutions generated by the conference to related services.

EVALUATION: Post-session surveys revealed high marks from the trainees for this curricular activity ($n=125$). On a 1–5 scale (1=poor, 2=fair, 3=good, 4=very good, 5=excellent), trainees rated the overall quality of session as 4.6 (SD 0.64) and estimated likelihood of making changes in practice as a result of the session as 4.4 (SD 0.80). We performed a qualitative analysis of 33 RCA's from the past 3 years and identified 6 common contributing factors to the adverse events or near misses: poor communication between PACT members; poor communication between primary care providers (PCPs) and providers outside of PACT; poor provider-patient communication; missed follow-up appointments; lack of timely access to appointments or tests; and tests not followed up appropriately. Twenty-two RCA's had 2 factors identified, 7 had 3 factors identified, and 2 had 4 factors identified. The most prevalent contributing factors were poor communication between PCPs and providers outside the PACT (70 %) and poor provider-patient communication (58 %).

DISCUSSION / REFLECTION / LESSONS LEARNED: We developed a novel approach to patient safety education for interprofessional trainees in the outpatient setting that was highly rated and requires limited curricular time. Experiential learning is an ideal

medium to teach quality improvement and patient safety skills: concepts that come from a brief trainee presentation can lead to tangible systems improvements. Communication errors contributed significantly in the RCA cases we reviewed, further emphasizing for our trainees the importance of the communication and teamwork training which is also part of our COEPCE program. Our next steps will be to improve opportunities for systems-based practice learning and optimization of clinical learning environments by involving the medical center's patient safety leadership in the RCA sessions. We will also ask presenters to revise and submit their proposed solutions from the RCA activity to leadership after incorporating input from the conference attendees. We strive for this curriculum to be both educational and contribute to system improvement; trainees' lasting impressions of this activity will arise from their work contributing to real change.

PANEL MANAGEMENT AS A CURRICULAR TOOL FOR DEVELOPING COMPETENCY IN QUALITY IMPROVEMENT Pete Spanos³; Mary A. Dolansky¹; Gloria Taylor³; Alli Heilman³; Renee H. Lawrence³; Sarah Augustine²; Brook Watts²; Anne Rusterholtz³; Mamta K. Singh². ¹Case Western Reserve University, Cleveland, OH; ²Louis Stokes Cleveland VAMC, Cleveland, OH; ³Louis Stokes Cleveland VA Medical Center, Cleveland, OH. (Tracking ID #2198997)

NEEDS AND OBJECTIVES: Panel management, a key tenet of the Patient-Centered Medical Home model, is shown to be an effective practice strategy for improving patient outcomes (Feldstein, Perrin, et al., 2010). There is little guidance, however, on how best to connect panel management to a curricular framework, and despite longstanding and new efforts, health professions education programs still face challenges successfully integrating quality improvement (QI) knowledge and application opportunities into ambulatory care education such that systems thinking, quality improvement and patient safety become a sustained part of everyday practice. A structured panel management curriculum can effectively help learners achieve the core Practice-Based Learning and Improvement (PBLI) and Systems-Based Practice (SBP) competencies by providing opportunities for learning and improving via performance audit (PBLI) and working effectively with other care providers to improve health care delivery (SBP).

SETTING AND PARTICIPANTS: As one of five Centers of Excellence in Primary Care Education (CoE-PCE) funded by the Veterans Health Administration's Office of Academic Affiliations to develop new models for training healthcare professionals, we developed a longitudinal program called Transforming Out-Patient Care (TOPC) that provides an immersive PCMH training experience for MD residents, Nurse Practitioner (NP) residents and students, and Health Psychology residents.

DESCRIPTION: Within the TOPC program, we developed a longitudinal curriculum—Quality Care Improvement (QCI)—that provides experiential learning in QI using real-time access to trainee panel patient data. Trainees are given a dedicated panel management half-day each week to use a web-based registry tool that allows them to systematically analyze groups of patients for selected criteria then apply QI tools and methods to make evidence-based improvements to care. Additionally, each panel management half-day has a mix of trainee types to foster interprofessional team learning and are led by core clinical faculty from different disciplines (nursing, medicine and health psychology) to provide expertise and guidance on pathways for care and available system resources to help manage patients with chronic diseases.

EVALUATION: Trainees complete short Minute Paper evaluations (Cross, Angelo, 1988) as part of QCI that provide ratings on usefulness and confidence-building (Singh, Lawrence, Headrick, 2011). These sessions have received an average rating of 4.56 out of 5 (1–5; 5=high; $n=503$; mode=5) for usefulness and average rating of 4.35 out of 5 ($n=500$; mode=5) for increased confidence. Also, preliminary focus group and exit survey results show that this QCI/panel management component of the overall program is highly valued, and preliminary analysis of panel data across time has shown a move toward optimal evidence-based outcomes—we will provide specific trend results for patients with diabetes.

DISCUSSION / REFLECTION / LESSONS LEARNED: Health professions competencies like PBLI and SBP emphasize systematic analysis of practice by using information technology resources to optimize learning and effect improvement change and the ability to recognize a system context and use available resources to provide quality care. Traditional clinical venues with short block rotations and lack of interprofessional teams and faculty do not create favorable teaching conditions for these core competencies. A longitudinal ambulatory clinical experience in a PCMH model with interprofessional learners and a strong data registry are key structural components of a robust panel management curriculum. Additionally, connecting this curriculum to a larger QI conceptual framework has allowed opportunities for learners to demonstrate achievement of PBLI and SBP competencies through quick evaluations, competency essays and improvement in clinical work. In summary, a formal panel management curriculum allows for quality improvement to become part of daily decision making and clinical work, a critical learning objective of health professions education.

PATIENT OUTCOMES AND RESIDENT SATISFACTION DATA AFTER INSTITUTING A 4+2 PRACTICE MODEL Eileen Wang³; Lisa M. Vinci¹; Vineet M. Arora²; Wei Wei Lee¹; John McConville¹; Julie Oyler². ¹University of Chicago, Chicago, IL; ²University of Chicago Medical Center, Chicago, IL; ³University of Colorado, Denver, CO. (Tracking ID #2197843)

NEEDS AND OBJECTIVES: Many internal medicine programs have instituted an X+Y block scheduling model, such as the 4+2, for ambulatory training. Previous studies have shown improved resident satisfaction but mixed patient outcomes. Our aim was to evaluate the effect of the transition to the 4+2 model on both resident and patient outcomes.

SETTING AND PARTICIPANTS: On July 1, 2013, an academic internal medicine training program transitioned to a 4+2 model during which residents spend 4 weeks on inpatient rotations followed by 2 weeks of outpatient clinic.

DESCRIPTION: Resident satisfaction was measured using an annual ambulatory survey and patient outcomes data was pulled from the electronic medical record on residents' clinic patients who had been seen at least twice by the same resident, at least once of which was in the pre or post period. Pre 4+2 data from October 2012 to April 2013 was compared to post data from October 2013 to April 2014.

EVALUATION: Patient demographics including average age (pre 58.1, post 57.8), gender (female pre 67 %, post 68 %), and race (African American pre 82.1 %, post 81.8 %) were all unchanged during the 4+2 transition. A higher proportion of patients had tighter diabetes control (those with HgbA1c < 7 pre 29.6 %, n=96, post 36.9 %, n=136, p<0.05) and increased influenza vaccination rates (pre 37 %, post 45 %, p<0.001). This resulted in 307 more patients vaccinated. Residents saw more patients after the 4+2 transition (number of patient encounters/resident over 6 months, pre 127, post 144, p=0.02). However there was an increase in missed appointments (pre 24.4 %, post 27.3 %, p<0.001), an increased rate of ED visits/patient over 6 months (pre 0.51, post 0.58, p<0.001) and hospitalizations/patient over 6 months (pre 0.30, post 0.32, p<0.001) after the transition. On the annual survey, residents reported that they were much more likely to be able to focus on outpatient education while in clinic (pre 37.3 %, post 71.1 %, p<0.001), and that the pace and session scheduling were adequate (pre 33.8 %, post 58.9 %, p<0.001), but that the continuity of clinic preceptor had declined (pre 80.0 %, post 61.8 %, p<0.01). The average number of residents attending teaching conferences increased after the 4+2 transition (pre 13.0, post 26.3, p<0.001).

DISCUSSION / REFLECTION / LESSONS LEARNED: The transition to a 4+2 training model resulted in many positive patient outcomes including: increased rate of influenza vaccination and higher proportion with tighter HgbA1c control. This model also resulted in improved resident outcomes with increased conference attendance, resident satisfaction, and number of clinic encounters. The drawbacks of the 4+2 model included more patient missed appointments, increased ED visits and hospitalizations, and decreased resident perception of preceptor continuity. Despite these drawbacks, the 4+2 model improved ambulatory training.

PATIENTS AS TEACHERS IN PATIENT SAFETY: A NEW INTERPROFESSIONAL EDUCATIONAL MODEL FOR COLLABORATIVE LEARNING ABOUT MEDICAL ERROR DISCLOSURE AND PREVENTION Thorsten Langer²; William Martinez³; David Browning²; Pam Varrin²; Barbara Sarnoff Lee¹; Sigall K. Bell¹. ¹BIDMC, Boston, MA; ²Boston Children's Hospital, Brookline, MA; ³Vanderbilt University Medical Center, Nashville, TN. (Tracking ID #2201116)

NEEDS AND OBJECTIVES: There is growing interest in engaging patients and families (P/F) in patient safety efforts, and in patient- and family-centered medical education, but robust partnership opportunities have been limited. P/F experiences when things go wrong highlight an important gap in effective communication after adverse events. However, the potential role for P/F in safety education has not been well-developed. Medical error disclosure training programs are rapidly disseminating, yet opportunities for patients and providers to come together, reflect, and engage in collaborative learning about patient safety communication are generally lacking in most practice settings. We developed, implemented and assessed a new educational model that engages P/F as teachers and co-learners with interprofessional clinicians on medical error disclosure and prevention.

SETTING AND PARTICIPANTS: Interprofessional clinicians and P/F from 2 academic hospital patient and family advisory councils in Greater Boston volunteered to participate. P/F who participated in the workshops attended an orientation session that focused on principles of collaborative learning. Three workshops were consecutively held in 2012/2013; each involving 20–25 participants.

DESCRIPTION: The 4-h workshops included an in-depth simulation with professional actors portraying the role of patients and family members, and clinicians playing their own

role in disclosure of a team error. Facilitators included physician, psychosocial, and family faculty who are practicing professionals and educators. The simulation focused on medical error disclosure and both clinician and P/F challenges with speaking up about potential safety threats. Each enactment was immediately followed by debriefing including the actors, clinicians, patients/family, and facilitators.

EVALUATION: A pre-post-survey with closed and open-ended questions assessed the acceptability of the model to P/F and clinicians, and the potential benefits and risks of including patients and family in medical error disclosure and prevention training. It also queried participants' experiences and perceptions about medical error, and attitudes about patient engagement in safety and speaking up. SPSS (21.0) was used for statistical analysis. Responses to open-ended questions were coded according to principles of content-analysis. Of participants, 53/55 (96 %) clinicians and 71/88 (81 %) P/F completed pre-surveys, and 42 % clinicians and 39 % P/F reported experiencing a harmful error. Of those, about half (57 % clinicians, 48 % patients) reported the error was disclosed. The vast majority (94 % clinicians, 88 % P/F) held positive expectations regarding collaborative learning. Participants reported their hopes, fears, what was valuable and challenging (Table 1). Clinicians prioritized learning "what it is like on the receiving end" of a disclosure conversation, and compassionate communication skills. Patients hoped to learn "what clinicians experience in a medical error;" "my role as a patient in minimizing errors", and preventing recurrences, and how to engage clinicians to learn from patients. Among concerns, clinicians cited power dynamics dampening effective interaction, and that P/F would "learn just how fallible we are." P/F were concerned about jargon, defensive posturing by clinicians, and dynamics, hoping they "have the freedom to speak openly" and are "willing to be seen as fallible human beings." To date, 48/55 (94 %) clinicians and 9/9 P/F completing the training reported the participation of P/F and clinicians (respectively) was valuable. Clinicians specifically valued direct feedback from "real" patients—"great insights I don't normally have access to." They reported learning concrete patient-centered approaches to error disclosure ("patients need time to process - we go too fast"). P/F appreciated insights into emotional impact of errors on clinicians (I had never heard medical people acknowledge feeling before), learning communication skills, and the honesty and accountability of clinicians.

DISCUSSION / REFLECTION / LESSONS LEARNED: An educational paradigm that includes patients as teachers and co-learners with clinicians about patient safety is feasible and highly valued by clinicians and P/F, particularly to help P/F and clinicians appreciate each other's perspectives, improve compassionate communication, and empower patients as safety partners. However, sensitive facilitation is required as participants may be worried to talk openly about medical errors and medical culture, including fallible providers and systems. Learning alongside patients and family sets the stage for building more robust partnerships between clinicians and patients. The authors provide recommendations about how to develop a patient-teacher in patient safety program (Table 2).

PREPARING FOR THE PRIMARY CARE CLINIC: AN AMBULATORY BOOT CAMP FOR INTERNAL MEDICINE INTERNS Lindsay M. Esch; Amber Bird; Julie Oyler; Wei Wei Lee; Sachin D. Shah; Amber Pincavage. University of Chicago, Chicago, IL. (Tracking ID #2193547)

NEEDS AND OBJECTIVES: Fourth year medical students often have limited exposure to primary care education in their last year of medical school and interns often report being unprepared to start internal medicine continuity clinic. Although boot camps have been used at the beginning of post-graduate training programs to improve preparedness and clinical skills for clinical work, there has not been adequate research regarding how to best prepare interns for primary care clinic. Our objective was to implement and assess the impact of an intern ambulatory boot camp on primary care knowledge, confidence, and curricular satisfaction.

SETTING AND PARTICIPANTS: During July 2014, 38 internal medicine interns attended ambulatory boot camp prior to starting primary care clinic.

DESCRIPTION: The boot camp included one half day of clinically focused case-based didactic sessions on common ambulatory topics including diabetes, hypertension, hyperlipidemia, health maintenance screening, shoulder pain and knee pain. This was followed by another half day of orientation to the clinic, outpatient team and EMR. To evaluate the curriculum, interns anonymously completed a 15 question pre-test on topics covered in the boot camp and were re-assessed with an identical post-test after the boot camp. The interns were also surveyed regarding their confidence, satisfaction with the boot camp experience and exposure to ambulatory education in medical school.

EVALUATION: Thirty eight interns participated in boot camp and all completed tests and surveys. Prior to the boot camp, few interns reported confidence managing common outpatient conditions: 55 % for hypertension, 50 % for hyperlipidemia, 42 % for health maintenance screening, 32 % for diabetes, and 11 % for musculoskeletal complaints. Only 15 % of interns felt they had received sufficient training in medical school to manage primary care patients. On average, the interns reported 2.9 months of primary care clinic

rotations during medical school. The average duration between the boot camp and the participants' last primary care clinic was 15 months. The number of prior outpatient rotations and the amount of time since the interns' last primary care rotation had no effect on the pre-test scores. The average pre-test knowledge score was 6.95/15 (46.3 %). After the boot camp, the average post-test knowledge score significantly improved to 11.42/15 (76.1 %) ($p < 0.001$). After completion of the boot camp, 100 % of interns reported that the boot camp was good preparation for clinic, 100 % felt that ambulatory boot camp should be a required component of internship, and 97 % felt that the lectures boosted their confidence in managing common conditions encountered in primary care clinic.

DISCUSSION / REFLECTION / LESSONS LEARNED: The intern ambulatory boot camp improved knowledge of commonly encountered medical topics in the primary care clinic. The participants thought it was good preparation and it should be a required component of internship. The intern ambulatory boot camp may be an effective way to improve the preparation of interns for primary care clinic.

PREPARING MEDICAL STUDENTS FOR THE FUTURE, RATHER THAN THE PRESENT Golub Lucas; Daniel D. Dressler. Emory University, Atlanta, GA. (Tracking ID #2200075)

NEEDS AND OBJECTIVES: Every day a practicing clinician comes up with dozens of clinical questions. The ability to efficiently fill in these knowledge gaps over the course of a medical career is an important skill. Medical education can only provide knowledge as it currently exists, and it is difficult to systematically teach the skills necessary to be a lifelong learner. Thus our objective were to create curriculum for medical students which would help them 1) efficiently answer clinical questions, 2) interpret summary medical literature, 3) utilize mobile and web-based resources for these purposes.

SETTING AND PARTICIPANTS: Our institution's medical school curriculum contains a 'capstone' component during the final month of students' forth year. There are multiple selective courses from which students choose to build a customized curriculum; ours is one. Typically around 25 students take the course.

DESCRIPTION: This course occupies two separate half-days, roughly a week apart. Day 1 provides several interactive didactic sessions on topics including evidence hierarchy, finding evidence to answer clinical questions ("pull" tools), monitoring new evidence as it is published ("push" tools), and systematically evaluating summary evidence (both guidelines and meta-analyses, with a structured journal club format to discuss representative examples of each). As homework for the second session, students individually prepare 2-min talks on separate "push" and "pull" resources. They also form small groups wherein each group asks a clinical question, searches for a piece of relevant summary literature, and systematically evaluates the article. Day 2 of the course is student led and involves the 2-min talks on relevant push and pull resources followed by discussions of the specific guidelines and meta-analyses that the groups have selected.

EVALUATION: Pre- and post-tests are given to students to assess both their comfort level with the topics discussed subjectively (Likert scale) and also objectively test their knowledge of concepts presented via multiple choice questions. In the 3 years that this course has been offered, 80 students have taken it. On average, Likert scores for confidence to effectively utilize push and pull resources increased from 3.1 to 4.6, and 3.6 to 4.7, respectively. Similarly, scores for the ability to critically appraise both guidelines and meta-analyses increased from 3.2 to 4.5, and 3.1 to 4.5, respectively. Of note, the students varied broadly in their future field of practice: 38 % internal medicine, 17 % surgical subspecialty, 12 % pediatrics, 10 % general surgery, 7 % emergency medicine, 7 % radiology, 7 % psychiatry or neurology, and 3 % OB/GYN.

DISCUSSION / REFLECTION / LESSONS LEARNED: With only two half-day sessions, soon-to-graduate fourth year medical students were able to significantly improve their competence with a number of core skills required to be lifelong learners and keep abreast of future advances in medicine. They left with practical knowledge to efficiently search the medical literature to answer clinical questions (pull resources) and have cutting-edge clinical information automatically sent to them (pull resources). Students were also taught how to systematically evaluate and interpret some of the most clinically relevant evidence types, guidelines and meta-analysis/systematic review. Given the pace of modern medicine clinically, as well as the exponential rate of growth of knowledge and information, we feel that these are some of the most high-yield skills which could possibly be taught to students and trainees alike. Based on objective data from pre- and post-testing of the course, these are not subjects that students feel comfortable with, even at the conclusion of 4 years of medical education. However, a small investment of time significantly increases proficiency with tasks that will last a lifetime.

READMISSION M & M Joseph J. Ingrassia; Sidra Azim; Shiromini Herath; Jennifer Baldwin; Scott Allen; Wendy Martinson. University of Connecticut, Farmington, CT. (Tracking ID #2194457)

NEEDS AND OBJECTIVES: A common goal for all healthcare institutions is to decrease preventable readmissions. John Dempsey Hospital of the University of Connecticut developed a multidisciplinary Morbidity and Mortality (M&M) style conference to help determine the root causes of readmissions. The main goals of the conference are to educate residents about readmissions and to analyze the causes of readmission for process improvement.

SETTING AND PARTICIPANTS: Investigations are conducted by Internal Medical Residents on a 4-week inpatient hospitalist medicine rotation. Residents meet with faculty, chief medical residents and quality specialists of the hospital to discuss the case at the beginning of the rotation and are educated and guided on how to do a root cause analysis of the readmission through weekly meetings with the team.

DESCRIPTION: Residents then conduct the investigation through review of medical records, patient and family interviews, and feedback from staff that provided patient care during the index admission and the readmission. The staff include the hospitalists, residents, fellows, nursing staff primary care physician and other specialists who are involved in the care of the patient. Case managers, home care agencies, discharge coaches and extended care facilities are also interviewed. The residents present their finding and lead a discussion at the monthly Readmission M&M that is attended by hospitalists, specialists, emergency room physicians, members of the palliative care service, and other ancillary staff including nursing, case management and social workers. Hospital administration, quality, and patient safety representatives also attend. At the conclusion of each conference, the residents submit an 'Apparent Cause Analysis' of the readmission that was investigated to the quality and safety department. The findings are used to drive quality improvement and patient safety initiatives.

EVALUATION: The conference identifies system failures that have contributed to readmission. The following are areas that have been identified for improvement: inpatient care management, appropriate utilization of local resources, communication across provider groups, medication reconciliation, and post-hospitalization management and coordination of care. Examples of specific opportunities for improvement identified by the residents that have resulted in changes in the system of care include: · Implementing an antibiotic review process in conjunction with the pharmacy department, to reduce the incidence of *Clostridium difficile* infection. · Development and reinforcement of email communications that alert in-network primary care physicians and specialists of patients that have been admitted to the hospital. · Performance of D-test for inducible Clindamycin resistance on MRSA isolates. · Documentation of the method of urine collection for specimens sent to Microbiology testing. · Creation of a survey of regional skilled nursing facilities based on quality and capabilities for most appropriate referral of patients. · Development of individualized care plans for future admissions by the hospitalist, the patient's primary care physician, specialists, and emergency room physician for patients with recurrent readmissions that anticipate complex care management needs.

DISCUSSION / REFLECTION / LESSONS LEARNED: Residents who presented the conference report having gained an understanding of clinical and psychosocial care that needs to be present across the continuum of care for best practice. They also learn about the interplay between readmissions, hospital reimbursements, and patient satisfaction. This initiative addresses three of the six focus areas of the Clinical Learning Environment Review (CLER) where residents participate in hospital initiatives to improve quality and safety. Further, this conference is educating all providers of cognitive and system errors that lead to hospital readmissions, and is providing an opportunity to discuss them in an open forum enabling solutions at the same time.

SELF-REGULATED LEARNING AND STANDARDIZED TEST PERFORMANCE IN INTERNAL MEDICINE RESIDENTS Mary Andrews²; Anthony R. Artino¹; Kevin M. Douglas¹; Kent DeZee¹. ¹Uniformed Services University of the Health Sciences, Bethesda, MD; ²Walter Reed National Military Medical Center, Bethesda, MD. (Tracking ID #2195924)

NEEDS AND OBJECTIVES: Standardized tests are ubiquitous in medical education and residents who underperform on these tests require considerable faculty time and resources to remediate. Novel methods of identifying and assisting these residents are needed. Self-monitoring (the practice of accurately assessing one's performance) and causal attribution (a personal belief about the reasons why one's performance meets standards or not) are two components of self-regulated learning theory that may provide a useful framework for identifying and correcting test-taking deficits. In our academic medical center, we have used a structured, face-to-face assessment of self-monitoring and causal attribution as part of a multifaceted remediation plan for struggling internal medicine residents. We conducted a pilot study to collect validity evidence for our methods. Our objectives were to determine the feasibility of measuring self-monitoring and causal attribution among internal medicine residents by means of an online examination and to determine whether self-monitoring and causal attribution, as measured by this online examination, correlate with performance on the In-Training Examination (ITE) and the USMLE Step 2 Clinical Knowledge (Step 2).

SETTING AND PARTICIPANTS: We conducted a cohort study of internal medicine trainees at a single academic medical center. All residents who had not participated in the face-to-face assessment were invited to participate.

DESCRIPTION: Participants completed an online examination consisting of 10 expert-validated, multiple-choice, clinical vignette test questions, each of which was followed by a single item measuring confidence in the answer on a Likert-type scale and three free-response items assessing diagnostic reasoning and answer justification. The confidence scores and the answer status for each test question (correct or incorrect) were used to calculate a self-monitoring score that ranged continuously from zero to four, with zero indicating complete miscalibration (repeatedly either over- or under-confident) and four indicating perfect calibration (i.e., very confident when correct and not at all confident when incorrect). The free-response items regarding diagnostic reasoning and answer justification were scored independently by two board-certified general internists using prespecified criteria to generate a causal attribution score which ranged from zero to 10. The higher the causal attribution score, the better the participant explained his diagnostic reasoning and justified his answer choice. Interrater agreement for scoring free response items was assessed by the kappa statistic. Correlation between self-monitoring and causal attribution scores and ITE percentile rank and Step 2 three-digit scores were examined using Spearman's rank correlation coefficient. Power analysis was based on an estimated sample size of 50 residents, which would have resulted in 80 % power to detect a correlation coefficient of 0.4 or greater.

EVALUATION: 22/77 (28 %) of internal medicine trainees participated in the study. Half of participants (11/22) were interns, eight were PGY2s, and three were PGY3s. The average number of multiple-choice questions answered correctly was 7.7/10 (SD 1.5). The average self-monitoring score was 2.4 (SD 0.4) on a 4-point scale, with a score of 4 indicating perfect calibration of the trainees' self-confidence with their performance. The average causal attribution score was 4.6 on a 10 point scale (SD 1.4), with a score of 10 indicating that the resident mentioned all details that the expert reviewers considered necessary when explaining their diagnostic reasoning and justifying their answer selection. The interrater agreement for scoring the causal attribution questions was moderate to substantial (median kappa=0.58, IQR, 0.49–0.78). There was no statistically significant correlation between ITE rank score and self-monitoring ($r_s=0.22$, $p=0.22$) or between ITE and causal attribution ($r_s=0.19$, $p=0.40$). Likewise, there was no statistically significant correlation between Step 2 CK scores and self-monitoring ($r_s=0.27$, $p=0.28$) or causal attribution ($r_s=0.21$, $p=0.41$). Post-hoc analysis showed that a sample size of 124 would be necessary to achieve 80 % power to detect a correlation of 0.25 or greater.

DISCUSSION / REFLECTION / LESSONS LEARNED: Measuring self-regulated learning in internal medicine residents via an online examination is feasible. Although we did not detect statistically significant correlations between self-monitoring and causal attribution and standardized test performance, we did find small effect sizes and we were limited by low participation rates. Future efforts to measure self-regulated learning should utilize incentives and dedicated time within the workday to encourage resident participation. Self-regulated learning theory remains a feasible tool for assisting trainees who underperform on standardized tests.

ONLINE RESOURCE URL (OPTIONAL): https://www.surveymonkey.com/s/SRL_Instrument

SERVING THE COMMUNITY AND UNDERSTANDING THE AFFORDABLE CARE ACT: UNIVERSITY OF MIAMI MEDICAL STUDENTS TRAINED AS CAC ASSISTERS Alison Moody; Jennifer Shiroky; Joe Bennett; Karyn Meshbane; Angelica Melillo; Jeffrey Lin; Katelin Snow; Mark O'Connell. University of Miami, Boynton Beach, FL. (Tracking ID #2199362)

NEEDS AND OBJECTIVES: The Affordable Care Act (ACA) gives Americans the opportunity to purchase health insurance through Health Insurance Marketplaces. Miami and SE Florida has one of the largest uninsured populations in the US. Faculty and student leaders from University of Miami Miller School of Medicine's (UMMSM) Department of Community Service (DOCS) saw the ACA as an opportunity to expand access to care for uninsured members of the community and felt that students would benefit from the opportunity to learn about health insurance and the ACA by becoming involved in its implementation. To that end, a project was developed to train and certify UMMSM medical students as Certified Application Counselors (CACs) in order to provide assistance to consumers seeking health insurance through the Health Insurance Marketplace.

SETTING AND PARTICIPANTS: A partnership was formed between UMMSM and the Health Council of South Florida (HCSF), a community organization that was awarded federal funding for training and managing insurance Navigators and CAC assisters. Some enrollment events were conducted in partnership with Enroll America, the White House's ACA organizing entity in Florida. Enrollment activities took place at the UM/Jackson Health System medical campus, a large public safety net hospital and academic health center in Miami. Students also provided assistance to consumers attending DOCS

community health fairs in several underserved communities in South Florida and in a student-run weekly free clinic.

DESCRIPTION: The choice to train as a CAC was made available to all UMMSM students and participation was voluntary. Students who chose to participate completed a 5-h online course created by the federal government and attended an in-person 1-hour training session hosted by DOCS student leaders. Once trained and certified by HCSF, students were asked to allocate a minimum of 2 h each week to educating and enrolling insurance consumers. In the first year of the ACA initiative (2013–14), 64 students were credentialed as CACs. These CACs provided insurance enrollment assistance on the UM/Jackson Health System campus 4 h a day, 5 days a week for 2 months of the enrollment period. Student CACs also organized community enrollment events and established an "Enrollment Assistance Station" at five UMMSM DOCS health fairs and a student-run weekly free clinic. Student CACs assisted over 300 consumers with creating accounts on Healthcare.gov, exploring their insurance options, identifying federal subsidies, and enrolling in a health plan. The State of Florida enrolled more consumers through the federal marketplace than any other state, and enrollment in Miami-Dade County was the highest in the state. For this second year's enrollment season, 76 students from UMMSM's Miami campus have been credentialed as CACs. Also, the ACA initiative was expanded to UMMSM's Regional Medical Campus in West Palm Beach where 16 regional campus students have become certified CACs under the aegis of the Health Council of Southeast Florida, the partner organization to HCSF in Palm Beach County. These students have attended numerous community events, enrolling consumers in health insurance plans and providing education and assistance to many more.

EVALUATION: All participants and partners consider the medical student CAC project to have been a valuable experience. We are currently conducting a formal survey of our CACs to assess the educational benefit of the project for our students and their perceived community impact. Survey analysis will be completed in February. This year's CACs will complete the survey at the end of the enrollment period allowing us to assess our progress and continue to shape the initiative for future years.

DISCUSSION / REFLECTION / LESSONS LEARNED: Students gained valuable insight into health insurance and the impact of social and financial factors on access to health insurance and care. These issues are underemphasized in medical education. Students were able to gain a unique perspective on barriers to care and frustrations experienced by consumers who struggle to navigate the health insurance system. Many Floridians do not qualify for or cannot afford health insurance as a result of the State's failure to accept Medicaid expansion. Insurance was not available to consumers who fell in the "Medicaid gap." They were referred to sliding scale clinics and to legal aid services. Students struggled with language barriers, as many individuals seeking healthcare through the marketplace in South Florida were Spanish and Creole speaking-only. This year, HCSF is providing a Spanish and Creole-speaking navigator to work with the student CACs. Our student CACs provided insurance education and enrollment assistance to several hundred consumers. We feel this model can be expanded to other medical schools providing future physicians with an understanding of the ACA and to the benefit of the communities in which they train.

SIMULATION IN AMBULATORY EDUCATION: A CURRICULUM INNOVATION Alexander S. Rackman²; Emily Ryan³; Rebecca A. Mazurkiewicz¹. ¹Lenox Hill Hospital Medicine, New York, NY; ²Lenox Hill Hospital NS-LIJ, New York, NY; ³Lenox Hill, NSLIJ, New York, NY. (Tracking ID #2195774)

NEEDS AND OBJECTIVES: 1. To determine if use of a patient care simulator in ambulatory resident education increased Internal Medicine resident comfort with performing breast and pelvic exams. 2. To determine if use of a patient care simulator in ambulatory resident education increases Internal Medicine residents' intent to perform breast and pelvic exams in the future. 3. To determine the perceived quality of a curriculum utilizing patient care simulators to perform breast and pelvic exams by Internal Medicine residents.

SETTING AND PARTICIPANTS: Educational modules were run by the investigators for the categorical Internal Medicine Residents at Lenox Hill Hospital who rotated on the ambulatory service during the 2014–2015 academic year. Each session was comprised of 1 facilitator and 4 resident attendees, for a total of 66 resident participants of any PGY level 1 to 3.

DESCRIPTION: Residents underwent individual baseline skill assessment (pretest) for breast and pelvic exams via direct observation by the session facilitator using checklists derived from ACP recommendations for these procedures. Residents then participated in a 1.5-h education session featuring patient scenarios in which one would perform breast and pelvic exams on a patient simulator. The case for the breast exam featured a patient complaining of a breast lump while the pelvic exam case featured a patient complaining of vaginal discharge. As a group, residents discussed the case then the session facilitator performed a stepwise demonstration of the procedure. Lastly, residents were retested (posttest) for breast and pelvic exams using the same procedure as the pretest. After the

session ended, residents were asked to complete an anonymous electronic survey to elicit the residents' comfort with breast and pelvic exams before and after the educational intervention, their likelihood to perform these ambulatory procedures in the future, as well as the overall quality of the educational session.

EVALUATION: Procedure performance, comfort with the procedures, likelihood of performing the procedures, quality of ambulatory procedure training before the educational intervention were compared to that after the intervention using descriptive statistics and mixed method assessment using qualitative and quantitative methods. All of the 66 residents who participated in the educational session completed the post-session survey. On a scale of 1 to 5 (from very uncomfortable to very comfortable), resident comfort with performing breast exams went from an average rating of 3.38 to 4.42 and pelvic exams from 2.74 to 4.08 after the educational session. Residents reported that on a scale of 1 to 5 (from very unlikely to very likely), residents rated the likelihood that they would have perform a breast exam for an asymptomatic woman (i.e. as part of an annual physical after the educational session) as a 2.33 before the educational session to 3.51 after the session. The intention to perform pelvic exams for screening purposes rose from 2.35 before the session to 3.42 after the session. On a scale from 1 to 5, the average rating of the educational session by resident participants was 4.73.

DISCUSSION / REFLECTION / LESSONS LEARNED: Residents had tremendous positive feedback, including the following anonymous comments: "Excellent teaching session, my comfort level with breast and pelvic exams has increased significantly." "Very informative and helpful." "Excellent educational experience! Despite feeling very comfortable prior to my clinical chloe session I now feel both comfortable and confident with both pelvic and breast exams." This educational intervention proved to be a unique curriculum innovation and is, to our knowledge, the first comprehensive ambulatory simulation model. The education session was designed to help residents feel more comfortable in performing pelvic and breast exams, while proving that they will intend to perform more of these sensitive exam maneuvers in the future. In future directions, we will be analyzing a more objective way to evaluate resident performance by using pre and post direct observation evaluation forms, which can also be used for the ACGME requirements of direct observations.

STAR (SAFE TRANSITIONS ACROSS CARE): AN INITIATIVE TO IMPROVE RESIDENT AND FACULTY EDUCATION TO IMPROVE PATIENT CARE ACROSS THE HEALTHCARE CONTINUUM Nancy M. Denizard-Thompson²; Kirsten Feiereisel¹. ¹Wake Forest Health Sciences, Winston-Salem, NC; ²Wake Forest University School of Medicine, Winston-Salem, NC. (Tracking ID #2196008)

NEEDS AND OBJECTIVES: 1. To Integrate a resident transition of care curriculum and provide associated faculty development 2. To create a tool to standardize an approach to discharge planning and hospital follow up visits 3. To evaluate utilization and impact of the STAR transitions of care tool

SETTING AND PARTICIPANTS: The educational innovation was designed and implemented at a large academic medical center targeting Internal Medicine residents and General Internal Medicine faculty.

DESCRIPTION: This curriculum was developed for residents and faculty to improve the discharge planning process and reintegration of patients into their community and medical home. Residents participated in 2 STAR seminars which introduced use of a STAR Transitions of Care tool with a dual purpose of educating learners while enhancing patient safety. This pocket card identifies key elements of a safe and successful transition across the care continuum. One side is for hospital discharge planning and highlights key elements of a safe discharge while the other side focuses on elements of the hospital follow-up visit. The first seminar simulated the inpatient discharge process using the discharge planning side of the STAR tool. The second session introduced the hospital follow-up side for use in clinic to inform residents about issues that may prevent readmissions and ensure that patients have safely transitioned to their home. As faculty need to be proficient in engaging and training residents on this important skillset in both the inpatient and outpatient settings we provided faculty development sessions on use of the STAR tool. These seminars followed the same structure as the STAR Educational Seminars described above.

EVALUATION: Residents completed a pre, immediate post and 6 month post survey measuring knowledge and attitudes of transitions of care. Approximately 30 residents completed the training seminars. Of the residents surveyed 44 % percent reported having very little formal training on discharge planning. In contrast, 53 % reported very little training on hospital follow-up and 47 % reported having had no formal training. The pre and immediate post evaluation demonstrated an increase from 68 to 95 % of residents feeling highly skilled (4 to 5 on Likert scale) in the key components of discharge planning and an increase from 50 to 74 % of residents feeling highly skilled in their ability to teach learners about discharge planning. Immediately following training, residents reported a number of domains that they planned to start to address in their discharge planning process. There was a 15 to 24 % increase in pending referrals and results, and

transportation needs; 25 to 34 % increase in home equipment needs; 35 to 44 % increase in goals of care and communication with key providers, and social networks; 45 to 53 % increase in patient's ability to obtain medications, family support systems, and education needs. The pre and immediate post evaluation demonstrated an increase from 43 to 96 % of residents feeling highly skilled (4 to 5 on Likert scale) in the key components of hospital follow-up visits. Immediately following training, residents reported a number of domains that they planned to start to address in their hospital follow up visits as a result of the seminar. Specifically there was a 15 to 24 % increase in areas of assessing whether key follow-up appointments had been scheduled; 25 to 34 % increase in assessing patient's understanding of hospital course; 35 to 44 % increase in ADLs and need for home health; 45 to 54 % increase in goals of care, cognitive and functional status, barriers to medication adherence, and family support systems; 55 to 74 % increase in assessment of equipment needs, social networks, and transportation needs. Review of 6 month post survey showed that the majority of these areas were maintained at higher levels. Seventy-four percent reported having used both the discharge planning and the hospital follow up component of the STAR tool in clinical practice. Faculty completed a pre and immediate post survey. Faculty data revealed that 62 % and 69 % had received no prior training on how to teach discharge planning and hospital follow-up, respectively. The pre and immediate post evaluation demonstrated an increase from 38 to 78 % and 54 to 86 % of faculty feeling highly skilled (4 to 5 on Likert scale) in teaching residents the key components of discharge planning and hospital follow up visits, respectively.

DISCUSSION / REFLECTION / LESSONS LEARNED: There is need for training of residents and faculty in discharge planning and even more significantly in hospital follow-up visits. We demonstrated continued use of the STAR transition tool by residents six month following training and persistent retention of knowledge and skills learned during the seminar. This intervention required minimal training time and provides a simple tool that is easy to use and disseminate to other sites. Next steps will include evaluation of hospital follow-up visits following implementation of the tool to evaluate effect on readmission and patient outcomes.

TEACHING CLINICAL NUMERACY TO INTERNAL MEDICINE RESIDENTS Frank W. Merritt. University of Colorado, Aurora, CO. (Tracking ID #2198355)

NEEDS AND OBJECTIVES: There has been a recent emphasis on teaching principles of evidence-based medicine and high-value care in graduate medical education, as evidenced by the Choosing Wisely initiative and described by subsections of the Practice-Based Learning and Systems-Based Practice core competencies laid out by the ACGME. To competently practice evidence-based medicine, physicians must have a foundational ability to accurately interpret literature regarding both treatments and diagnostic tests and to translate these data into decisions for individual patients. However, most physicians-in-training—and most practicing physicians—have poor ability to understand medical statistics and, more importantly, have difficulty using those data productively to promote rationale clinical decisions. This set of skills, which has been termed "clinical numeracy," may not be adequately conveyed to learners through a traditional journal club curriculum.

SETTING AND PARTICIPANTS: A pilot curriculum was delivered to the entire intern class in Internal Medicine at our institution over the course of 6 months, with monthly interactive lectures and case-discussions. Each session was approximately 30 min long and included 10–12 interns.

DESCRIPTION: Our objective was to provide learners with the fundamental skills of clinical numeracy and the ability to apply these skills to limit unnecessary or harmful tests and interventions. The first half of the curriculum dealt with the accurate assessment of risks and benefits of treatments, including understanding the relationship between absolute and relative risk reduction and understanding the difference between patient-centered outcomes and less-helpful surrogate outcomes. Case-based teaching encouraged learners to use these skills to make difficult individualized clinical decisions, making recommendations for or against hypothetical medications. For instance, learners were asked to discuss how strongly they would recommend a drug with a statistically significant but very small absolute risk reduction of myocardial infarction to a patient in whom the drug was a considerable financial burden. The second half of the curriculum dealt with the rational use of diagnostic testing. We explored principles of Bayesian reasoning and the importance of understanding pre-test probability as well as a test's ability to change the probability of a diagnosis (usually best expressed as a likelihood ratio). These diagnostic probabilities were considered in the context of "treatment thresholds." Again, we used a case-based format and interactive discussion to encourage learners to determine whether a test would change management in a given scenario. We discussed how cognitive biases may hinder accurate interpretation of tests, particularly if test characteristics are not known by the ordering physician and if pre-test probability is not considered. Several key overarching concepts were woven throughout the course, including cost-effectiveness, effective communication of risk and benefits to patients, and dealing with uncertainty in medicine.

EVALUATION: The initial response from learners was positive. To the statement “This session significantly furthered my understanding of how to practice evidence-based medicine in a real world setting,” the average response was 4.6 on a 5-point Likert scale ($N=108$). Similarly, for the statement “I will be able to use skills from this session in my regular practice,” the response was 4.5 out of 5 ($N=108$). Additionally, we have preliminary data showing a trend towards improved scores on the Critical Risk Interpretation Test (CRIT), a previously validated assessment that uses brief clinical vignettes to assess clinical numeracy. The test was administered to 41 interns prior to the curriculum and 37 interns repeated the test 6 months later. There were significant differences in several specific skills measured by the CRIT, including rating morality as more important than 5-year survival rates in screening studies (87 vs. 53 %, $p<0.01$), recognizing that disease is unlikely when pre-test probability is extremely low, even with a positive diagnostic test (40 vs. 5 %, $p<0.01$), and recommending treatments that improve mortality rates more strongly than treatments that only improve surrogate outcomes (90 vs. 56 %, $p<0.01$) or composite outcomes (57 vs. 17 %, $p<0.01$).

DISCUSSION / REFLECTION / LESSONS LEARNED: Teaching fundamental clinical numeracy concepts may complement the traditional journal club curriculum in internal medicine residency programs and is perceived by learners to be beneficial. Ideally, these skills should be taught in a problem-based manner that gives learners skills that they can apply in a real-world setting. Future efforts will focus on encouraging learners to implement these ideas in practice and measuring changes in behavior and culture.

TEACHING VALUE-BASED CARE TO MEDICAL STUDENTS TO INCREASE HIGH QUALITY, COST CONSCIOUS CARE Sara-Megumi L. Naylor; Erin L. Duffy; Neveen S. El-Farra; Allison Diamant. UCLA Medical Center, Los Angeles, CA. (Tracking ID #2190985)

NEEDS AND OBJECTIVES: Ongoing changes to the healthcare system demand further education of physicians to consider the benefits, harms, and costs of their daily interventions for patients. Focusing on medical students early in their career can promote cultural and process change that will increase their likelihood of practicing value-based care. There is minimal data regarding the attitudes, knowledge, and skills of medical students regarding value-based care. Similarly, there is no data regarding the impact of educational interventions on the willingness or confidence of medical students to practice such care. We designed and evaluated an educational intervention that introduces value-based care to medical students.

SETTING AND PARTICIPANTS: A total of 33 students were included. Specifically we recruited 22 third year medical students from the UCLA David Geffen School of Medicine who were rotating on the inpatient internal medicine clerkship at Ronald Reagan UCLA Medical Center between January and June of 2014. Eleven third year medical students at different clerkship sites served as controls for the intervention.

DESCRIPTION: We designed a prospective survey-based cohort study of an educational intervention. The project received IRB approval. The educational intervention consisted of clinical cases, interactive activities, and resources that highlight value-based care. The material was generated from reviewing the literature and by using the available resources found through the ACP High Value Care initiative as well as the ABIM Choosing Wisely campaign. The intervention was conducted in a group setting and lasted 1 h. There was a concerted effort to generate personalized, concrete strategies for students to practice value based care in their current role as medical students on inpatient ward teams. We collected pre-intervention, post-intervention, and delayed (3 months) post-intervention survey data to measure attitudes, self-perceived skills, and knowledge regarding value-based care. All responses were on a 5 point Likert scale. Paired *t*-test were utilized to assess differences between pre-intervention and post-intervention surveys.

EVALUATION: Overall we found the educational intervention to be effective in promoting value-based care. We found that only 33 % of students either somewhat agreed or strongly agreed that they have a role as medical students in controlling healthcare costs prior to the intervention, but this increased to 81 % after the intervention. Interestingly, 90 % of students either somewhat agreed or strongly agreed that they will have a role in controlling healthcare costs as a physician even prior to the intervention, hinting that we likely need to empower and prepare our medical students more during the third year of medical school to practice value-based care. We found the educational intervention was most effective in encouraging students to think about cost. After the educational intervention, there was a significant increase in students' reported likelihood of looking up the cost of a specific test or procedure prior to recommending it as part of the treatment plan ($p<0.001$), discussing the cost of a specific test or procedure with a patient ($p<0.001$), and discussing how the cost of a specific test or procedure will impact the finances of the patient ($p=0.018$).

DISCUSSION / REFLECTION / LESSONS LEARNED: If providing high-value, cost-conscious care becomes a “critical seventh general competency for physicians” as proposed by SE Weinberger, MD, there will be a large need for defined curricula to

address these current gaps in our education. It is important to design and measure educational interventions that can meet the needs of medical students. We were reminded that teaching must be deliberate and purposeful as we found that approximately one-third of third year medical students reported never receiving any education on value based, high quality and/or cost-conscious care despite required classes on these topics during the first 2 years of medical school. Our data was limited by sample size as students were at various training sites and few students opted to voluntarily complete surveys online. We also found discussing cost to be challenging given the lack of transparency of charges and costs and the long-standing history of avoiding the discussion of money in medicine. Finally, we were unable to measure the impact of our intervention on the actual skills of medical students in practicing value-based care and the impact of our education on real patient and system outcomes. Our future goal is to optimize this teaching initiative through sequential, iterative changes and implement the project for all medical students prior to entering their third year clerkships.

TEAM QI: AN INNOVATIVE STEPWISE APPROACH TO INVOLVE RESIDENTS IN QUALITY IMPROVEMENT INITIATIVES IN THE OUTPATIENT SETTING Elena Lebduska³; Amar Kohli¹; Erika L. Hoffman⁵; Gary Fischer²; Carla Spagnoletti²; Jaishree Hariharan⁴. ¹UPMC, Pittsburgh, PA; ²University of Pittsburgh, Pittsburgh, PA; ³University of Pittsburgh Medical Center, Pittsburgh, PA; ⁴University of Pittsburgh Medical center, Pittsburgh, PA; ⁵VA Pittsburgh Healthcare System, Pittsburgh, PA. (Tracking ID #2199104)

NEEDS AND OBJECTIVES: ACGME recognizes that internal medicine (IM) trainees must achieve competence in systems based practices. The outpatient setting is an ideal place to teach these skills. With many residency programs going to an inpatient/outpatient “block system” achieving continuity for quality improvement (QI) projects in the outpatient setting becomes a challenge. With this in mind, we developed an educational initiative that aims to: 1) Increase resident interest and participation in QI projects in the outpatient setting by using a resident-driven team-based approach; 2) Improve the care of outpatients by addressing chronic disease management in the new “block system”; 3) Foster increased interaction and communication between residents and ancillary clinic staff.

SETTING AND PARTICIPANTS: Participants are the 140 residents affiliated with the University of Pittsburgh Medical Center. All residents follow a panel of continuity patients with faculty supervision in one of three hospital-based clinical sites: a university clinic ($n=52$), a community clinic ($n=36$) and a VA clinic ($n=52$). In the new block system, residents have clinic one full day each week (Monday-Thursday) every other month. Residents have been placed into QI teams based on their clinic day, for a total of 8 QI teams per site. Ancillary staff is also involved in the initiative (nurses, medical assistants, secretaries, and clinic directors).

DESCRIPTION: The pilot year for this initiative is 2014–2015. At non-VA clinic sites, the focus of the resident QI project is diabetes. Eye and foot exams were initially identified as the quality measures with the least compliance rates; thus, our focus this year is to improve these measures using a longitudinal, multistep, innovative approach. To date (September through December 2014) the following steps have been completed: Step 1) Residents received a short didactic session on principles of QI. Step 2) Using automated chart review, they identified their diabetic patients who have not received these exams. Step 3) They each used a worksheet to review their charts to identify key barriers and brainstormed interventions for improvement. Step 4) Residents joined together in their QI teams, and along with ancillary staff input, compiled their individual data using a worksheet and selected interventions for implementation. Step 5) A resident “team leader” from each group, along with ancillary staff, the clinic director, and faculty clinicians, convened to form a QI council. Interventions developed by the teams were voted on and the top 3–4 were selected to be clinic-wide QI interventions. The remaining steps will occur in January through June 2015: Step 6) Team leaders will work with ancillary staff to finalize protocols for the chosen interventions which will be launched in mid-January. Step 7) Teams will meet every other month to review progress and make adjustments. The VA-based clinic residents are following a similar 7-step approach but will be focusing their QI interventions on improving hypertension metrics.

EVALUATION: Worksheets were developed to assist individual residents and QI teams with Steps 1–4. Data derived from the university hospital site (52 residents), shows that 47 of 52 completed individual worksheets (participation rate (PR)=90 %) and all 8 teams completed worksheets (PR=100 %). Their QI council decided to focus on 4 interventions pertaining to the eye exam. Effectiveness of the QI interventions at all sites will be assessed through process measures and quarterly data through June 2015. QI methodology is also being used to evaluate this educational initiative. Throughout this process we have collected a running list of successes and failures, which has allowed us to make changes in the moment as we learn from our experiences. In addition, surveys will also be distributed to residents and ancillary staff bi-annually to assess participants' QI interest and knowledge, team dynamics, and resident leadership.

DISCUSSION / REFLECTION / LESSONS LEARNED: This is a team-based educational initiative to teach residents about QI and to improve patient care. It is unique in that it is resident-driven and utilizes an innovative stepwise approach that can easily be extrapolated to a variety of QI interventions at different clinical sites and institutions. To date, the initiative has successfully engaged nearly 140 residents in the QI process, and has fostered collaboration between residents and ancillary clinic staff. What we have learned so far: 1) The team structure allows for a collaborative, non-judgmental environment for residents to share information, discuss barriers and be creative. 2) Residents came up with meaningful interventions with minimal attending guidance. 3) Many interns have few continuity patients, so being part of a team is beneficial. 4) Scheduling time for QI projects into resident schedules is imperative for successful participation. 5) Transparent comparison of pertinent disease metrics, stratified by team, is expected to encourage healthy competition for improvement.

THE ADDICTION RECOVERY CLINIC: A NOVEL PRIMARY CARE-BASED APPROACH TO TEACHING ADDICTION MEDICINE Jeanette M. Tetrault²; Stephen Holt¹; Dana Cavallo¹; David A. Fiellin¹. ¹Yale University, New Haven, CT; ²Yale University School of Medicine, New Haven, CT. (Tracking ID #2199058)

NEEDS AND OBJECTIVES: Substance use is prevalent in the U.S. resulting in major public health burdens. Despite the high prevalence of substance use in Internal Medicine (IM) practice, little curricular time is devoted to training IM residents in Addiction Medicine (AM) and evaluating their skills in identification, diagnosis, treatment and prevention of substance use and substance use disorders. We developed and launched the Yale Addiction Recovery Clinic (ARC), intended to meet this educational deficit while also providing an outpatient clinical service to patients with addictive disorders, based upon the chronic disease management model. The educational objectives of the ARC include providing IM residents with knowledge of the biologic basis for addiction, and educating residents about available pharmacologic and behavioral interventions.

SETTING AND PARTICIPANTS: The ARC is embedded within our outpatient adult Primary Care Residency Clinic and is staffed by two to three IM trainees per block, two AM-certified attending physicians, one AM Fellow, one social worker and a licensed behavioral psychologist and provides comprehensive care to patients with addiction. During their ambulatory rotation, trainees spend ½ day per week for four consecutive weeks at the ARC seeing new and established patients.

DESCRIPTION: Patient referrals are made from both the outpatient Primary Care Residency Clinic, and the inpatient service. Inpatient consults are evaluated by the ARC team during the inpatient stay, treatment is initiated, and follow up with the ARC is then arranged. Once patients are stabilized at the ARC, residents are encouraged to transition the patients' care back into their longitudinal primary care practice, utilizing the skills obtained during their ARC rotation. Services provided within the clinic include: treatment of opioid use disorder with buprenorphine induction, maintenance therapy, and behavioral counseling; treatment of alcohol use disorder with pharmacotherapy (naltrexone, disulfiram, acamprosate) and behavioral counseling, outpatient management of alcohol withdrawal, consultative services for other drugs of abuse (e.g. marijuana, cocaine), smoking cessation pharmacotherapy and counseling, and direct referral to local addiction treatment facilities for patients who cannot be safely managed within the ARC.

EVALUATION: We developed a multi-level evaluation system. Clinical practice is evaluated by visit numbers and patient satisfaction surveys. Between August 2014 and December 2014, a total of 156 visits were seen with an average of 2 new patients and 7 follow-up patients were seen during each half-day session. Fifty percent of patients were treated for opioid use disorder, 30 % for alcohol use disorder and 20 % for other substance use disorder. Patient satisfaction surveys are currently being collected and analyzed. Residents are evaluated using a novel Entrustable Professional Activity (EPA) based system specifically designed for this rotation, which includes three specific EPAs across ten different domains. Overall, the rotation has been highly regarded by the residents as assessed by qualitative evaluation data.

DISCUSSION / REFLECTION / LESSONS LEARNED: The ARC offers a unique primary care-based approach to teaching IM residents the knowledge and skills to identify, diagnose, treat and prevent addiction throughout the disease spectrum, in keeping with the chronic disease management model. A multilevel assessment system is used to evaluate the overall clinical practice, resident performance and skill acquisition through an EPA based system, and resident satisfaction with the educational experience.

THE DANGER OF ONLINE MODULES? TESTING THE MULTI-PATIENT OBSERVED SIMULATED HANDOFF EXERCISE (M-OSHE) TO ASSESS ENTERING RESIDENTS PERFORMANCE IN DELIVERING HANDOFFS Vineet M. Arora²; Sean Gaffney¹; Jeanne M. Farnan¹; Kristen Hirsch¹; Michael McGinty¹. ¹University of Chicago, Chicago, IL; ²University of Chicago, Chicago, IL. (Tracking ID #2198619)

NEEDS AND OBJECTIVES: The new ACGME Clinical Learning Environment Review focus on care transitions benefits from enhanced standardized training and assessment across residency programs. Despite this, there are few validated resources to either teach or evaluate patient handoffs in a robust way. In addition, the AAMC has identified transfer of patient responsibility as a Core Entrustable Professional Activity for entering residency (CEPAER), which makes rigorous baseline assessment of handoff performance among incoming interns a priority. We aimed to assess whether prior training and prior handoff experience is associated with improved performance among entering residents in 4 programs (IM, Peds, OB, Surgery) during a novel multi-patient Observed Simulated Handoff Experience (m-OSHE).

SETTING AND PARTICIPANTS: A comprehensive handoff curriculum was embedded into the GME Orientation for four core residency programs (IM, Peds, OB, Surgery) at one institution.

DESCRIPTION: The curriculum featured an online training module completed prior to GME Orientation and a multi-patient Observed Simulated Handoff Experience (m-OSHE). Participants verbally "handed-off" a set of mock patients and then were evaluated and given feedback by a trained "handoff receiver" using an expert-informed, five-item checklist. Objective performance ratings and pre- and post- survey data were used to assess the effectiveness of the curriculum.

EVALUATION: Eighty-four interns completed the curriculum. Self-reported preparedness for conducting a verbal handoff increased after the online module (88 % post-module vs. 54 % pre-module, $p < 0.0001$ Wilcoxon sign-rank test) and after the m-OSHE (70 % post-mOSHE vs. 54 % pre-module, $p < .001$). There was a decline in self-reported preparedness after the m-OSHE compared to after the online training module. The mean checklist score was 3.23 (SD 1.09) and did not differ across residency programs. Self-reported preparedness at baseline and post m-OSHE was not associated with checklist scores. However, prior handoff experience in medical school was associated with higher checklist scores (23 % none vs. 33 % either 3rd OR 4th year vs. 58 % 3rd AND 4th year, $p = .021$, Trend Test). While all participants struggled with the prioritization of patients (30 % correct), prioritization did differ by residency program (8 % Pediatrics vs. 30 % Surgery vs. 33 % OB/Gyn vs. 44 % Medicine, $p = .016$, Chi2). Prior training was associated with the ability to prioritize patients based on acuity (12 % no training vs. 38 % prior training, $p = .014$, Chi2). All (100 %) participants agreed that the online training module was an effective review of handoffs and that the m-OSHE was a realistic portrayal of a clinical setting.

DISCUSSION / REFLECTION / LESSONS LEARNED: This study demonstrates that online training modules may invoke an inflated sense of preparedness among incoming interns that is adjusted when learners experience a realistic clinical simulation like the m-OSHE. The superior performance of residents with prior training and more handoff experience highlights the importance of considering formal handoff training prior to the start of residency. Positive learner-feedback indicates that this method is a promising strategy for teaching and evaluating handoffs that may be used at other institutions. Expanding and tailoring this curriculum to other programs and bolstering training in medical schools on handoffs is an important next step.

THE DAWN OF INTERPROFESSIONAL MEDICINE: EVIDENCE FOR INTERACTIVE SIMULATIONS WITH MEDICATION RECONCILIATION Melissa A. Gaines¹; Jason Foster¹; Maitri Patel². ¹University of Kansas SOM-Wichita, Wichita, KS; ²University of Kansas School of Pharmacy, Lawrence, KS. (Tracking ID #2192952)

NEEDS AND OBJECTIVES: Medical students need to have proficiency in reconciling medications during care transitions to improve patient safety. Medical students also have barriers to electronic medical records during their training which precludes active order writing. Currently, medical students have parallel learning in patient care during inpatient rotations, but no interprofessional opportunities during their MS3 year. Our objectives were: (1) to identify medications that should be avoided or used with caution in older adults and explain the potential problems associated with each, (2) to document the dose, frequency, indication, benefit, side effects, and an assessment of adherence for each patient's complete medication list, including prescribed, herbal and over-the-counter medications, and (3) to improve their teamwork skills by engaging in collaborative communication (ICS-D3), considering alternative solutions provided by other team members (SBP-B3), working effectively in interprofessional teams to ensure safe patient care, and responding productively to feedback from all members of the team.

SETTING AND PARTICIPANTS: The MS3 medical students and the P3-4 pharmacy students met in a classroom during the medical students' required 4 week geriatric clerkship. There are 8-10 students per workshop with one faculty facilitator.

DESCRIPTION: This workshop was a brown bag medication review utilizing a care transition from hospital discharge to office follow-up highlighting medication reconciliation. Multiple prescription bottles were collected and labels made to indicate the

instructions. One was dosed too high and there were several different prescribers and pharmacies utilized. The students were given the case history and general conceptual ideas of how to evaluate a medication list. The hospital medication reconciliation form was given to students with the case example. The brown bag contents included bottles marked with name, dose and frequency with duplications and incorrect dosing. Students were asked to suggest 5 changes to the list. Possibilities included, but were not limited to, safety, duplication, indication, serious side effect profile, dosing schedule, cost, and prescribing cascade. At the end of the workshop, students wrote a new medication order for the patient.

EVALUATION: A post-test survey was administered with 6 questions that were answered based upon a Likert scale and area for comments. The questions reflected teamwork and interprofessional competencies when mapped to internal medicine residency competencies including flexibility and respect for team communication. Students were given written feedback about their written medication orders by the preceptor.

DISCUSSION / REFLECTION / LESSONS LEARNED: Most students strongly agreed that the interprofessional workshop enhanced their learning experience. They also agreed that they felt comfortable writing a new medication list for a patient recently discharged from the hospital. There were comments such as "Have not done a med review case before, so was a good experience"; "It was good to learn how pharmacy students learn and their view about care". For future experiences, the students asked for more time and cases using standardized patients which would be an opportunity for a simulation interprofessional experience using a hospital dismissal care transition. This workshop increased medical student's awareness of information sources regarding medications to avoid, correct dosing of medications, and how to assess drug interactions in the elderly.

THE EDUCATIONAL HANDOFF: BLENDING DIGITAL LEARNING AND STANDARDIZED PATIENT-BASED ASSESSMENT TO MEASURE AND ENHANCE CORE ENTRUSTABLE PROFESSIONAL ACTIVITIES (EPAS) FOR ENTERING RESIDENCY Adina Kale²; Steve Yavner³; Hyuksoon Song⁴; Demian Szyld¹; Martin V. Pusic¹; Grace Ng¹; Mike Nick¹; Thomas Riles¹. ¹NYU School of Medicine, New York, NY; ²New York University School of Medicine, New York, NY; ³Fairfield University, Fairfield, CT; ⁴Georgian Court University, Lakewood, NJ. (*Tracking ID #2198652*)

NEEDS AND OBJECTIVES: UME and GME Medical Educators must ensure that new interns both demonstrate competence in 13 core Entrustable Professional Activities (EPAs) recently defined by the AAMC and are able to recognize and safely manage common "coverage" conditions among hospitalized patients on day of residency, one as defined by the ACGME. However, there is no consensus on how this should be addressed, assessed, and documented. Our goals in this project are to 1) understand and maximize the readiness for internship of our graduating medical students (MS4s) 2) develop and benchmark high quality and clinically meaningful, educationally responsive measures and methods to assess core EPAs 3) pilot and evaluate an efficient and scalable blended digital learning and performance based assessment strategy to address gaps in readiness for internship.

SETTING AND PARTICIPANTS: In the week prior to medical school graduation we recruited 52 MS4s to participate in a 3-h "readiness for internship" event held in our simulation center. The study of this event was IRB approved.

DESCRIPTION: For this pilot we assessed intern's readiness to assess and manage oliguria in the acute care setting and designed two Standardized Patient/Standardized Nurse simulation cases and built measures of 10 of 13 core EPAs. Students then saw one case before (post-operative) and one after ("rule out MI") spending up to 40 min interacting with the Oliguria MD on Call module (MDOC). In each SP/SN case the student, playing the covering intern returned a page to the SN (5 min), evaluated the SP with the SN in the room (20 min) then wrote a "coverage note" (10 min). Students could request lab values, ECGs and imaging results and simple bedside procedures (foley placement, IV fluids) from the SN. Student EPA assessment data was captured in 3 ways; SPs completed checklists measuring Communication Skills and PE both scored as % of items well done (interrater reliability .55-.81); SNs completed checklists measuring Care Quality and Safety, Collaboration and Interprofessional Communication Skills (interrater reliability .47-.52); Clinical Reasoning was assessed based on the "coverage note" and scored using R.I.M.E. Framework (reliability assessment underway). MDOC, a series of case-based multimedia digital modules, aims to prepare interns for common clinical coverage issues. It is designed to promote clinical reasoning of novice clinicians by building and refining diagnostic schemas or scripts. To assess students' oliguria schema before completing MDOC we gave them a blank piece of paper with the following prompt; "In the next 5 min, please write or draw how you think about oliguria". Two clinicians scored the results using a 3 level rubric (Kappa .78).

EVALUATION: Baseline core clinical skills of these motivated volunteer MS4s were highly variable; Communication skills (73 %, SD 27.5 %) and physical exam (51 %, SD

15.5 %), SN ratings (36 % SD 14.5 %) and clinical reasoning (.94, SD .52 on a 3 point scale). Before viewing the oliguria MDOC modules 59 % of students were able to present a clear and organized semantically sophisticated schema for oliguria (e.g. Pre-Renal, Renal, Post-Renal) with mention of related key features, diagnostic and management implications; 21 % represented only a basic set of diagnostic categories; and 17 % of these students could not convey an organized structured approach. We observed moderate to large gains in all clinical competency areas measured pre/post MDOC- communication (Cohen's d .41), physical exam (1.5), communication with the nurse (.61) and clinical reasoning (.64)). Supporting both the immediate educational impact of MDOC on performance and the sensitivity of our measures to instruction. In general, students appreciated being able to practice skills and reported that this 3-h event was highly educational, time well spent and challenging but enjoyable and asked us to host more on other topics.

DISCUSSION / REFLECTION / LESSONS LEARNED: We were able to assess 10 of 13 core EPAs and demonstrate that MDOC used in this manner addresses significant skills gaps. Although they need to be refined, our assessments were reasonably reliable measures, with the advantage of being authentic and synthetic. All core EPAs and many of the common topics required for transition from UME to GME can be assessed and addressed using this style of blended assessment/learning experiences. This spring we plan to study various blending strategies to determine best practices and work on an appropriate assessment report. This work will inform meaningful educational handoffs and optimal use of web-based instructional materials in the service of optimizing health professions education and patient safety and quality.

ONLINE RESOURCE URL (OPTIONAL): URL for MDOC Oliguria module http://wmddv1.s3-website-us-east-1.amazonaws.com/Oliguria/v5_0_1/index.html

TRAINEE EVALUATION IN THE HEAL INITIATIVE: A MULTIDIMENSIONAL FRAMEWORK FOR A NOVEL GLOBAL HEALTH FELLOWSHIP Alanna Stone¹; Madhavi Dandu¹; Sriram Shamasunder¹; Phuoc Le¹; Robin Tittle². ¹University of California, San Francisco, San Francisco, CA; ²Santa Clara Valley Medical Center, San Jose, CA. (*Tracking ID #2194689*)

NEEDS AND OBJECTIVES: The Health, Equity, Action & Leadership (HEAL) Initiative is a unique fellowship training opportunity developed at the University of California, San Francisco (UCSF) to build Global Health work force capacity in the United States (US) and abroad. The mission of the fellowship is to equip US physicians as well as domestic and global partner fellows with the ability to be leaders in global health while making a sustainable impact on health equity and disease burden in resource poor settings. The fellowship has the following overarching objectives for trainees: 1. Provision of high quality care focused on local burden of disease 2. Effective engagement in local health systems 3. Demonstration of leadership and interprofessional team management skills 4. Development of strong and diverse teaching skills 5. Advocacy for communities, health systems, and patients 6. Adherence to principles of health equity and ethics in clinical and academic work. The present proposal describes a plan for trainee evaluation to meet the needs of a diverse group of learners who are expected to achieve competencies within the defined objectives.

SETTING AND PARTICIPANTS: Eight UCSF HEAL Initiative fellows will be selected from accredited US-based Internal Medicine, Pediatrics, Family Medicine, Psychiatry and Emergency Medicine residencies. There will be a total of 8 partner sites—4 through the Indian Health Service (IHS) in the Navajo Nation (AZ and NM) and 4 in developing countries (Liberia, India, Haiti, and Mexico). Each partner site will nominate and select locally-based HEAL Initiative fellows (can be any healthcare provider) to participate in training for a total of 16 trainees per year.

DESCRIPTION: UCSF HEAL fellows are paired and will alternate clinical responsibilities in 4 month blocks between IHS and developing country sites over a period of two years. The fellowship will begin with a one month intensive curriculum in July 2015 for both UCSF HEAL fellows and HEAL fellows selected by partner sites. All fellows have the option of obtaining an online Master in Public Health (MPH) degree from the University of California, Berkeley over the two year period. Each cohort of fellows will be assigned a faculty mentor from UCSF who will conduct periodic site visits and oversee evaluation. Each site will also have a designated mentor for trainees to provide feedback and support.

EVALUATION: A multidimensional framework for evaluation of fellows in the HEAL Initiative is necessary because the trainees are multi-specialty, interprofessional, and cross-cultural. The evaluation is structured around competencies developed from the core objectives of the Initiative. These competencies were defined through an iterative process involving fellowship leaders, curriculum committee, and partner sites. The evaluation framework will be housed within a portfolio that can be accessed by both trainees and mentors. The center of the framework is an individual development plan (IDP) created by the trainee with assistance of their mentor at the start of the fellowship. The IDP will encompass competencies from all six core objectives, but can be tailored to meet the

diverse backgrounds and experiences of the fellows. The trainees will also undergo biannual standardized evaluation on meeting the fundamental competencies of the fellowship utilizing a milestones rubric representing development from novice to expert. These evaluations will be completed by both UCSF and site mentors. In addition to these formalized assessments, fellows will do periodic reflective exercises to assess their own progression in their development plan and will provide feedback to their peers on these reflections.

DISCUSSION / REFLECTION / LESSONS LEARNED: The HEAL Initiative is a novel fellowship that involves training in resource-poor settings both domestically and in developing countries. It will involve learners who come from diverse educational and experiential backgrounds and who will have unique training experiences based on their site of practice. Thus, a multidimensional framework of evaluation is necessary to meet the needs of all of the trainees. The evaluation will be learner specific with input from longitudinal mentors as well as from peers. As all health professions training becomes interprofessional, it will be necessary to develop innovative means to assess learners with diverse backgrounds. This framework uses established evaluation tools but creates a flexible and easily adaptable format that may be applied to evaluate interprofessional learners and curricula in other settings.

ONLINE RESOURCE URL (OPTIONAL): <http://healinitiative.org/>

TRAINING INTERNAL MEDICINE RESIDENTS IN CARE OF PATIENTS WITH DISABILITIES: DEVELOPMENT OF A NOVEL CURRICULUM
Bliss Temple; Sharad Jain. UCSF, San Francisco, CA. (Tracking ID #2198807)

NEEDS AND OBJECTIVES: Despite about 20 % of the US Population having a disability, physicians in training receive little education about how to care for these patients.[1] In studies of health care trainees[1], PM&R residents[2], and Family Medicine residents[3], residents have reported a lack of skills for caring for patients with disabilities and a need for training. There are no specific ACGME requirements for education of Internal Medicine residents in this area. Literature review and web searches did not identify any Internal Medicine residency program with a formal curriculum in caring for patients with disabilities. We saw a need to develop such a curriculum to provide residents with a sense of the health and health policy issues specific to patients with disabilities, improved clinical skills for working with these patients, and knowledge about resources for this population.

SETTING AND PARTICIPANTS: The curriculum was developed for use as part of the UCSF Internal Medicine—San Francisco General Hospital Primary Care residency, which focuses on care for underserved and vulnerable populations. Categorical residents electing to participate in the Health Equity: Academics and Advocacy Training (HEAAT) track were also included in the course. It was given twice for different groups of about 12 residents in 2014 and will be repeated in 2016.

DESCRIPTION: A novel curriculum was developed consisting of: – a general didactic session, – small-group clinical case discussions about patients with a variety of disabilities, – an experiential workshop on caring for patients with low vision, – a talk by a local disability expert on working with patients who are Deaf or hard of hearing, and—a site visit to visit local and national organizations working with people with disabilities, which also included a health policy talk by a national expert. The course was broken into four half-day sessions given during a 1-month ambulatory care block.

EVALUATION: Course participants were surveyed on each sub-component's relevance to practice, contribution to knowledge, and effectiveness of the presentation and associated learning materials using a 5-point Likert scale, with one being least and 5 being most useful. For the site visit, they were also asked to compare this field trip with others that are part of their training using a 5-point Likert scale ranging from "one of the worst" to "one of the best". Mean scores for relevance to practice and contribution to knowledge (respectively) for the general didactic session were 4.3 and 4.3; for the small-group case discussions were 4.7 and 4.7; for the low-vision workshop were 4.0 and 3.5; and for the local expert session on caring for patients with hearing impairments were 4.0 and 3.7. All participants rated the field trip as a 5. Participants also provided free-text comments with significant themes being the usefulness of this training for practice and a perceived need for similar training at all levels of medical education.

DISCUSSION / REFLECTION / LESSONS LEARNED: There is a need for Internal Medicine residency programs to include formal training on caring for patients with disabilities, who are a significant population group with specific health needs. UCSF residents regarded a new disability curriculum as being relevant to practice and contributing to knowledge. Didactic sessions, case discussions, and especially a site visit with disability organizations were particularly helpful. Other Internal Medicine programs should consider introducing similar curricula as part of residency education. 1. Holder, M., H.B. Waldman, and H. Hood, *Preparing health professionals to provide care to individuals with disabilities*. Int J Oral Sci, 2009. 1(2): p. 66–71. 2. Moroz, A., et al., *Immediate and follow-up effects of a brief disability curriculum on disability knowledge*

and attitudes of PM&R residents: a comparison group trial. Med Teach, 2010. 32(8): p. e360–4. 3. Jain, S., et al., *Patients with disabilities as teachers*. Fam Med, 2013. 45(1): p. 37–9.

TRANSITIONS OF CARE CURRICULUM FOR INTERNS: PILOTING FORMAL DISCHARGE EDUCATION Christopher Bruti; Christine Tsai; Jansi Maganti. Rush University Medical Center, Chicago, IL. (Tracking ID #2192184)

NEEDS AND OBJECTIVES: Effective coordination of care within and across healthcare delivery systems is a national patient safety priority and an important competency for Internal Medicine residents. Residents are expected to work in teams and transmit clinical information that ensures proper transition of care between health care settings. Current evidence suggests that residents often do not receive and would like formal education on how to appropriately discharge patients. Our objectives were to teach interns the importance of evaluating discharge needs on admission, describe the roles of other professionals in the discharge process, explain the differences between different post-discharge care settings, and identify the importance of proper medication reconciliation in an effort to enable interns to efficiently and effectively discharge patients.

SETTING AND PARTICIPANTS: In spring 2014, we interviewed case managers, nurses, pharmacists, residents and faculty for topics and tips essential to teach interns regarding discharge. We then created an innovative presentation outlining our institution's multidisciplinary approach to discharge planning that highlighted the intern's role in this process. We encouraged interns to understand the patients' discharge needs from time of admission and throughout hospitalization, emphasizing the importance of collaboration in creating a safe, personalized, and effective plan. We also developed a teaching handout organized as a timeline. Beginning July 2014, we presented our curriculum monthly to new interns on the second day of their rotation on the general medicine floor, timing the class to maximize applicability.

DESCRIPTION: The presentation was done in an interactive small group format using a *Prezi*. It covered how to assess discharge needs on admission, a basic introduction to various insurance types and their importance, the types of post-acute care settings, home health services available, the role of case managers and other interprofessional staff, and the importance of proper medication reconciliation. The discharge timeline was an outline of questions to ask and things to consider at various points in the hospitalization (admission, during hospitalization, the day before discharge, and the day of discharge).

EVALUATION: We conducted five sessions and administered a survey immediately after the lecture, surveying 56 interns in total. Forty-one ranked the session helpful, 15 somewhat helpful. None ranked it neutral, somewhat unhelpful, or unhelpful. On qualitative analysis, the most helpful aspects included providing a framework for preparing discharge, teaching the importance of medication reconciliation, and the creation of a handout for future reference. All surveyed recommended the curriculum be given to future interns. Several Interns thought the sessions would benefit from specific images of the electronic medical record discharge screens.

DISCUSSION / REFLECTION / LESSONS LEARNED: We believe that our curriculum provided our Interns with tools to enhance efficiency and patient safety during transitions of care. Our Interns found the program valuable, and we will continue to improve the curriculum based on feedback. We plan on enhancing the curriculum by adding screenshots from the electronic medical record to make it even more practical. This curriculum can be easily adopted by other programs, providing a framework for teaching safe transitions of care.

USE AND IMPACT OF AN OBJECTIVE STRUCTURED TEACHING EXERCISE (OSTE) TO IMPROVE DIRECT OBSERVATION SKILLS AND ATTITUDES AMONG FACULTY Jeremy Smith; Amy Smith; Mary Thompson; Maryam Heydari. University of Wisconsin, Madison, WI. (Tracking ID #2188597)

NEEDS AND OBJECTIVES: Direct observation (DO) of trainees has been shown to identify clinical deficiencies otherwise unrecognized, enhance learner skill and confidence, and increase frequency of feedback. At our institution, however, DO was not being performed regularly. We recognized that faculty development is inherent to the success of DO. Therefore, we designed and implemented a faculty development program, which included the use of an OSTE, with the overall goals of increasing the amount and quality of DO of learners. Our objectives for our faculty participants were to: 1. Appreciate the educational utility of DO 2. Improve attitudes about the burden of DO 3. Improve confidence in skills of observation, evaluation, and feedback

SETTING AND PARTICIPANTS: Nine 4-h workshops were conducted over a 6 month period, each with 15–20 participants. A total of 161 Department of Medicine faculty attended a workshop. Faculty were invited based on the extent of involvement with clinical teaching, and were strongly encouraged to participate, with a specific

recommendation from the Department Chair. The workshops were facilitated by 3 persons, consisting of one physician and two educators, all of whom had some prior experience with faculty development.

DESCRIPTION: The program began with the definition and subsequent group discussion of pertinent terms related to DO. A fishbowl activity was then conducted, which consisted of two facilitators role-playing a clinical encounter between a patient and a resident, in front of the assembled group of participants. Workshop participants were instructed to act as faculty conducting DO of that resident's clinical performance. Group discussion then ensued about what feedback might be given to the resident. This discussion enabled the facilitators to expound on certain concepts, such as the difference between evaluation and feedback, the use of self-assessment questions, formative versus summative evaluations, and the characteristics of effective feedback. The participants then broke into small groups, and discussed logistical barriers to DO. Facilitators guided the groups to troubleshoot these problems. The large group reconvened, and these proposed solutions were then discussed and shared among all participants. This section of the program took approximately 2 h. The second half of the program consisted of an Objective Structured Teaching Exercise, which is a simulation tool for evaluating and providing feedback for teaching skills. The faculty were divided into groups of 3–4, and rotated through each of 4 stations. Each station contained a standardized learner (a medical student or resident volunteer), and 3 of the 4 stations included a standardized patient. The stations consisted of a learner taking a history from a patient, a learner performing a physical exam on a patient, a learner counseling a patient about a treatment plan, and a learner receiving end-of-rotation feedback. At each station, 1 of the faculty was the Teacher, observing the encounter and providing the learner with feedback. Feedback to the Teacher was then provided by the standardized learner, the other participating faculty, and a facilitator. After the completion of the OSTE, the large group was reconvened for final debriefing and take-home points.

EVALUATION: Survey data was collected by participants at the beginning of the workshop, at the end, and approximately 6 months after completing the workshop. Six month follow-up data is currently being analyzed, but immediate post-intervention surveys showed improvements in faculty attitudes and self-assessed skills in several domains. Participants' perception of the value and utility of DO increased significantly. There were also significant improvements in participants' attitudes about the burden of DO. Participants reported significantly improved confidence in several skills related to DO and giving feedback. Narrative evaluation data suggested that most participants felt the OSTE to be the most impactful aspect of the program, while others felt uncomfortable in role-play, and desired more didactic and less interactive teaching.

DISCUSSION / REFLECTION / LESSONS LEARNED: With this program, we were able to successfully train over 160 faculty in the skills of DO, and improve their attitudes about the feasibility and utility of conducting DO. One of our initial concerns was whether we would be able to have our faculty find the time to participate in the program. We found that with specific encouragement from the Department Chair (in the form of a group email), and follow-up emails from the facilitators, 161 of 163 targeted faculty actually completed the workshop. Most participants found great value in practicing the skills of DO in the OSTE. Facilitators reported that this part of the program was highly successful in getting participants comfortable doing DO, and in obtaining high-yield feedback for participants. However, there remained a proportion of faculty who noted the artificiality of role-playing, and did not perceive great value in that exercise.

USE OF A GROUP OSCE IN TEACHING DIFFICULT COMMUNICATIONS Gita Mehta¹; Neil J. Farber²; Simerjot K. Jassal²; Peggy Wallace¹; Robert MacAulay¹. ¹UCSD, La Jolla, CA; ²UCSD/VASDHHS, San Diego, CO; ³University of California, San Diego, La Jolla, CA. (Tracking ID #2200663)

NEEDS AND OBJECTIVES: Residency training usually does not provide adequate structured training for developing communication skills, particularly in difficult situations. We evaluated the use of a Group Objective Structured Clinical Exam (GOSCE) based workshop using Standardized patients (SPs) in improving resident confidence in difficult communications, and as a method to provide feedback to medical residents about such communications.

SETTING AND PARTICIPANTS: Forty-two R1-R3 residents in Medicine participated in a structured interview that involved communication with 4 SPs: in 2 cases, Residents were asked to give bad news to 2 SPs, deal an angry SP, and disclose a medical error to a 4th SP. Residents moved as pairs from one case to the next, alternating as participant or observer, while faculty were assigned to a specific case. Faculty members viewed each interaction remotely in a monitoring room, and then joined the residents and SP to debrief on each interaction and provide feedback.

DESCRIPTION: Forty-two R1-R3 residents participated in 2 separate sessions. Prior to the workshop, residents and faculty were given a tutorial on giving bad news and dealing with medical errors. Residents were given 15 min to communicate with each SP, and as they were paired, residents interacted with 2 SPs and gave feedback on 2 interactions.

Immediately following each interaction, 15 min was spent in giving feedback to each resident by an observing colleague in the room, the SP and the observing Faculty member. All residents completed an evaluation form after concluding the workshop.

EVALUATION: Measures of success: Prior to attending the workshop, 8/42 (19 %) had significant experience delivering bad news, 13/42 (30 %) had experience working with an angry patient, while only 2/42 (<10 %) had experience dealing with a litigious patient. 15/42 (71 %) residents reported previously being directly observed and given feedback while delivering bad news, 26/42 (69 %) when working with an angry patient, and 12/42 (28 %) when dealing with a litigious patient. Over 85 % (36/42) of residents felt the workshop was valuable, and they learned specific ideas they could implement. 31/42 (73 %) felt they acquired new and/or advanced skills, and had more confidence upon which to base difficult communications in the clinical setting. All residents felt the overwhelming strength of the workshop was the feedback from the faculty, SP and a colleague.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our data supports the utilization of a group structured exercise in improving resident confidence in difficult clinical interactions. This setting also permits immediate feedback to the resident from various sources including peers, SPs, and faculty members. The unique opportunity to have 15 min of constructive feedback from three different people was felt to be particularly valuable. A group OSCE can be used at a Medical Resident level to teach communication skills in difficult situations, and also provide an environment for constructive feedback for all participants

USE OF COMMUNITY HEALTH WORKERS TO TRAIN MEDICAL STUDENTS IN THE SOCIAL DETERMINANTS OF HEALTH AND CROSS-CULTURAL COMMUNICATION Shreya Kangovi³; Pratyusha Yalamanchi³; Casey R. Chanton¹; Tamala Carter¹; Robyn A. Smith²; Horace Delisser². ¹Penn Medicine, Philadelphia, PA; ²University of Pennsylvania, Philadelphia, PA; ³Perelman School of Medicine, Philadelphia, PA. (Tracking ID #2193185)

NEEDS AND OBJECTIVES: Medical students often lack training in how to assess and address the psycho-socioeconomic determinants that shape the health of vulnerable populations. To address these gaps, we created a medical student clinical elective rotation called the IMPaCT Teaching Service. In this externship, fourth year medical students served as apprentices to community health workers (CHWs). CHWs are trusted members of the community, hired and trained by the University of Pennsylvania Health System to support low-income patients in reaching health goals. The objectives of the course were for students to: • Understand challenges low-income patients face in maintaining health • Develop cross-cultural communication and negotiation skills • Learn health care and community resources available to low-income patients • Learn to advocate in the healthcare setting for patients to obtain needed care and services

SETTING AND PARTICIPANTS: This was a 2–4 week clinical elective rotation open to fourth year medical students. CHWs and students served patients who: 1) were admitted to the inpatient general medical service, 2) were uninsured/insured by Medicaid, and 3) resided in a 5-ZIP code low-income community of West and Southwest Philadelphia.

DESCRIPTION: Students worked closely with senior CHWs to conduct the four stages of the IMPaCT intervention. 1) Meeting the patient: On the day of admission, students conducted an in-depth interview exploring patients' psycho-socioeconomic histories. Students worked with their patients to develop patient-centered goals for care. 2) Hospital Discharge: Students advocated for low-SES patients during the discharge process, ensuring that they could afford discharge medications and perform discharge instructions. Students learned about the use of low-cost formularies, prescription assistance programs, Medical Assistance, and health coaching skills such as teach-back. 3) Return to the Community: After discharge, students provided tailored support to patients using home visits and calls. Students connected patients to community-based services and used motivational interviewing to support health behavior change. 4) Primary Care: Students facilitated and attended PCP follow-up appointments for their patients, particularly those who received care in community health centers. In addition to the patient care described above, students participated in weekly discussions designed to create dialogue between students and CHWs on controversial topics such as "the difficult patient", disability and entitlement programs and institutional racism.

EVALUATION: Between January 13, 2014–December 14, 2014 we conducted 7 in-depth semi-structured interviews with students and CHWs to explore their perceptions of the course and obtain suggestions for improvement.

DISCUSSION / REFLECTION / LESSONS LEARNED: Three key themes arose from the qualitative interviews. First, the course allowed students to appreciate the lived experience of their patients. The CHW reflected on a student's reaction when a cab refused to pick them up from a low-income neighborhood: "and then it was so frustrating get a cab for the patient who was on crutches. [The student] couldn't believe it. And this is what I'm saying. In our community, when you ask for a cab, and they say where you at? Oh no,

we don't come there." Second, despite challenges, students realized that many psychosocial barriers could be addressed. "[The medical team] often feels like, oh this is something that we're not gonna be able to solve. In the very bottom [of the note] is discharge and it usually just says, like 'talk to social work and discharge planner' Watching [CHW] look at this problem, I saw her come up with creative solutions." Finally, it was sometimes challenging for patients to transfer the trust from CHWs to the students. "[The patient] told me briefly what was going on, but she didn't want to tell me in front of the med student." CHWs dealt with this by coaching students on empathy and active listening skills in order to foster trust. "Teaching the med student how to understand patients from their view...wait on the paperwork. Get to know that person first, get that wall down." A student concurred, "And she would just let the patient talk. It's amazing what they can tell you that no one ever knew, because there's just this open space, it's a safe space, the patient will just tell - talk about all the things in their lives that a lot of doctors are not able to get." Based on our pilot experience, the Perelman School of Medicine has decided to make the IMPaCT Teaching Service a permanent course offering. The Center for CHWs is also exploring the option of opening this elective course to nursing students.

ONLINE RESOURCE URL (OPTIONAL): <http://chw.upenn.edu/>

WORK LIFE BALANCE IN RESIDENCY, HOW TO MAKE IT POSSIBLE
Delaram Moazami, Capital Health, Trenton, NJ. (Tracking ID #2199181)

NEEDS AND OBJECTIVES: One of the core requirements in the ACGME Program Requirements for Internal Medicine states "the program must be committed to and responsible for promoting patient safety and resident well-being in a supportive educational environment." Resident well-being is essential for optimal resident learning as well as competent and compassionate patient care. It is estimated that 27–75 % of residents are burned out at any given time depending on the medical specialty.

SETTING AND PARTICIPANTS: To promote a culture of wellness, our program developed the Wellness Curriculum to assess and improve resident well-being during their training. Goals: To increase coping skills and strategies to manage stress. To identify and recognize burnout symptoms and signs in themselves and others. To introduce the concept and importance of wellness at the beginning of residency. To create and maintain a supportive educational environment in which wellness is a mindful value.

DESCRIPTION: In a series of didactic sessions, residents were educated about the importance of recognizing symptoms of fatigue and burnout in themselves and among their peers. Wellness goals were added to the agenda of monthly faculty advisor meeting. The Program and the GME Department monitors resident duty hours and teaches residents ACGME Duty Hour requirements. The Program has a referral system in place for residents to seek help confidentially. A series of monthly Resident Well-being topics was added to the Noon Conference agenda throughout the year, once a month: Video and discussion of "Struggling in Silence: Physician Depression and Suicide" (American foundation for Suicide Prevention) Debriefing sessions Lectures about healthy diet, substance abuse, fatigue and sleep deprivation. Lectures and interactive sessions about professional competence and relationship: difficult patient, conflict management, social media, team building exercise, job satisfaction, insurance companies, medical health reform. In addition, innovative wellness activities took the place of traditional Noon Conference lecture format. Some of these included the value auction game, simulated calls to a loved one and reflections on thankfulness. Through these activities residents were able to focus on issues that are important outside of residency training. A variety of group activities were added throughout the year as "stress relievers" and team building activities. Some of these included: fundraising for AHA, holiday and birthday celebrations, off-site social gatherings, community activities (volunteering at NYC Marathon, local flu vaccine event) Residents have been involved in different activities to increase a sense of control: Hospital committee, curriculum committee, and Program Evaluation Committee. Faculty members were encouraged to provide positive feedback and to use praise card. The Maslach Burnout Inventory (MBI) was administered to 32 residents.

EVALUATION: Thirty-two out of 32 residents took the MBI. The group average scores for Emotional Exhaustion and Depersonalization were less than general population and for Personal Accomplishment was more than general population. 15.6 % (5/32) resident had severe burnout and 28.1 % (9/32) had moderate burnout. The results were provided to residents and will be monitored by the program and faculty advisors.

DISCUSSION / REFLECTION / LESSONS LEARNED: Through the Wellness Curriculum, our residents have a greater understanding of the relationship between their well-being and the provision of high quality, and safe patient care. Methods of identifying residents with increased stress and burnout are implemented, as well as avenues for relief and treatment of burnout symptoms. Elements of the curriculum will be implemented earlier in the PGY1 year including during orientation. Wellness issues will be discussed during semiannual resident evaluation meetings and resident-faculty meetings.

WORKING TOGETHER TO TAKE THE PAIN OUT OF CHRONIC PAIN: AN INTERPROFESSIONAL EDUCATIONAL EXPERIENCE IN GRADUATE MEDICAL EDUCATION Bennett Lee; Allison E. Phillips; Steven Bishop; Rachel R. Waller; Laura Morgan; Bryan Jensen; Benjamin D. Lord; Brigitte L. Sicut; Bruce Rybarczyk. Virginia Commonwealth University, Richmond, VA. (Tracking ID #2184824)

NEEDS AND OBJECTIVES: Interprofessional education and collaboration is critical to medical education and practice and is being increasingly integrated into undergraduate medical education. While graduate medical education (GME) trainees do interact with pharmacists and psychologists to complete parallel patient care activities, they rarely collaborate to learn from one another. We developed a series of team-based learning (TBL) activities with learning teams composed of medical residents, pharmacy residents, and clinical psychology graduate students. We describe the development and evaluation of an interprofessional education (IPE) TBL module on Chronic Non-Cancer Pain in the ambulatory setting. At the end of this TBL, we expected learners to be able to do the following: 1. Assume responsibility as a provider for assuming a non-biased attitude towards patients on chronic opiates 2. Encourage the use of cognitive behavioral therapy (CBT) and recognize its value 3. Embrace and recognize the necessity of a team-oriented approach toward patient management 4. Recognize risk factors for prescription drug misuse in patients treated with chronic opioids 5. Identify common differential diagnoses for aberrant medication use behavior 6. Administer common practice tools for monitoring patients treated with opioids 7. Explain CBT to a patient and prepare him/her to participate in CBT as an adjunct to pharmacologic therapy 8. Assess an initial management plan for effectiveness, tolerability, and safety

SETTING AND PARTICIPANTS: Participants included 59 medical residents, 10 pharmacy residents and 7 psychology graduate students in a single TBL session.

DESCRIPTION: The TBL module was developed collaboratively by faculty from all three disciplines. To prepare for the module, facilitators sent participants pre-reading assignments in advance (preparatory work). Readings consisted of guidelines or review articles. Facilitators ensured that all teams included at least one pharmacy and one psychology trainee. During the session, teams completed a quiz on the reading, first individually and then as a team (readiness assurance test), followed by facilitated discussion of interactive cases requiring complex patient care decisions (group application exercises). Each case was constructed to require input from all professions in order to develop an appropriate answer.

EVALUATION: At the conclusion of the session, learners assessed, on a 4-point scale, with 1=never, 2=sometimes, 3=often and 4=always, their likelihood of developing team-oriented attitudes, performing team-based tasks related to caring for patients with chronic non-cancer pain, and applying new medical knowledge. The first two response levels 'never' and 'sometimes' were combined due to small numbers reporting 'never' to any of the survey items. The survey asked learners to assess their ability both before and after training (retrospective pre-post design). Wilcoxon signed-rank tests were used to determine if mean differences between pre- and post-test scores were significantly different from zero. Generalized estimating equations were used to determine how profession and gender affected participant responses. All survey questions had a statistically significant increase in mean score between the pre- and post-assessment ($p < 0.0001$). The largest increases were seen in participants' likelihood of explaining cognitive behavioral therapy (CBT) to a patient to prepare him/her to participate in CBT as an adjunct to pharmacologic therapy (1.06), their likelihood of encouraging the use of cognitive behavioral therapy (CBT) (0.90), and their likelihood of identifying common differential diagnoses for aberrant medication use behavior (0.76). Reported scores differed by profession with psychology graduate students reporting higher scores in their likelihood of encouraging the use of CBT compared to both medical and pharmacy residents. Pharmacy residents were more likely to report higher scores in the likelihood of assessing an initial management plan for effectiveness, tolerability and safety when compared to both medical residents and psychology graduate students.

DISCUSSION / REFLECTION / LESSONS LEARNED: This IPE TBL experience in GME appears to have had a positive effect on all learners, with increases not only in perceived knowledge of how to manage chronic non-cancer pain, but also in attitudes toward team-based care. The data appear to show an overall increase in participants' likelihood of explaining CBT, and also encouraging its use. Perhaps not surprisingly, psychology graduate students were more likely to encourage the use of CBT. TBL is a potentially powerful way to leverage interprofessional learning experiences; however, the module did take significant time to plan and implement (10–15 h of planning). The session is also most fruitful if all participants are able to do the pre-reading of material, which can be a challenge. Further study is needed to determine if changes in attitudes seen here are sustained and if they lead to actual changes in team-oriented behavior.

***INNOVATIONS IN CLINICAL PRACTICE (ICP)**

“IT’S BIGGER THAN JUST THE VISIT”: A HOSPITAL FOLLOW-UP INITIATIVE TO ADDRESS SOCIAL DETERMINANTS OF HEALTH AND PROMOTE HIGH QUALITY TRANSITIONS OF CARE Nancy M. Denizard-Thompson; Kirsten Feiereisel. Wake Forest University School of Medicine, Winston-Salem, NC. (Tracking ID #2200370)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Although much work has been done to improve time to hospital follow up visit the quality and breadth of these visits is often lacking.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Decrease variability of hospital follow up visits among residents in clinic through a standardized template 2. To improve quality of hospital follow-up visits by addressing key issues that affect readmission and safe transition back to the community and medical home 3. To simultaneously train residents on the key components of a hospital follow-up visits and social determinants of health

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The intervention was implemented at two outpatient internal medicine resident clinics at an academic medical center. The clinics serve an underserved patient population. The intervention is a hospital follow up template created for the electronic medical record and developing isolated hospital follow-up clinics at the resident clinics. The template incorporates elements that are often lacking in a hospital follow-up visit such as access to medications, functional status, social support, and home care needs. It also emphasizes areas such as medication reconciliation, pending labs, and key studies that are areas that prior research has shown can lead to hospital readmission. It also meets standards and contains prompts for the transition of care billing codes. In addition many residents reported that there was not enough time in a regular visit slot to address the complex issues in a hospital follow up visit. There for hospital follow up clinic schedules were created at both clinic sites. The clinic schedule template was adjusted to allow 40 to 45 min for hospital follow up visits depending on the clinic site given the complexity and importance of the visit to improve the health of patients and readmission rates.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Increase use by residents in their clinic sites of the hospital follow up template 2. Recognition by the residents and faculty preceptors that the hospital follow up template caused them to discover missed items that they would not have discovered using a regular visit note template 3. Realization by residents that issues such as transportation, functional status, family support, and social networks are key to patients having a safe transition back to the community 4. Residents reported that having the hospital follow up visits separated from the continuity visits allowed them to focus on the hospitalization and key issues that would prevent further hospitalizations

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Preliminary chart audit comparing previous hospital follow up visits to visits incorporating the template revealed that things such as functional status, social networks, transportation, and ability to access medications were reported in a higher number in those who did use the template. In addition those who used the template had a higher rate of routing the document to the primary care provider or other key providers in the care of the patient. A more formal chart audit is in process.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1. The residents demonstrated steady growth in usage of the template and it is gaining persistent attending and resident enthusiasm. 2. A standardized template incorporating key social determinants of health and highlights clinical areas of concern for patients with high readmission rates promotes safe transitions of care and improves patient’s outcomes. 3. Having a separate hospital follow up clinic with longer appointment times allowed residents to perform higher quality hospital follow up visits 4. Attending physicians also reported that the quality of the hospital follow up visit notes had improved.

A COLLABORATIVE PHARMACIST-MANAGED CHRONIC PAIN CLINIC IN A PRIMARY CARE SETTING Katy E. Trinkley¹; Carmen L. Lewis³; Huong M. Lam²; Chelsea Mitchell¹; Jessica Norman¹. ¹University of Colorado, Aurora, CO; ²University of Colorado, Denver, CO; ³University of Colorado, Denver, NC. (Tracking ID #2200605)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Chronic opioid users are a complex and high risk population who are high utilizers of primary care services; however, providers are often not comfortable managing these patients or do not have adequate time to assess/address their needs.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): An interdisciplinary team including a pharmacist is best equipped to address the needs of the growing population of chronic pain patients. Currently, there is limited literature describing the role of a primary care pharmacist collaborating with primary care providers (PCPs) to improve patient-centered (e.g., patient satisfaction with pain control, adverse effects, impact on daily life) or other clinically significant (e.g., pain scores, opioid burden) outcomes for patients with chronic pain. Therefore, we have developed and implemented a collaborative pharmacist-managed chronic pain clinic (CPC) in a primary care setting to meet the following objectives: 1) Improve patient reported satisfaction with pain control (e.g., pain scores, overall satisfaction, adverse effects, impact on quality of life); 2) Decrease opioid burden and increase use of appropriate non-opioid adjunctive pain medications; and 3) Improve patient understanding of how to adhere to pain medication regimen (e.g., timing of administration).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The CPC is a collaborative service between PCPs and the clinical pharmacy team at the University of Colorado’s Anschutz Internal Medicine Clinic (UMA). The pharmacy team consists of one pharmacy attending, and rotating medical students, pharmacy students and pharmacy residents. The pharmacy team screens an electronically generated list of chronic opioid users and reviews their medical records to determine eligibility. Eligible patients receive primary care at UMA and have taken opioid medications for at least 3 months. Patients are not eligible if they have a terminal diagnosis, are pregnant, followed by a pain management specialty clinic, or have active cancer. All patients deemed eligible are reviewed by their PCP who accepts or denies a referral to the CPC. Accepted referrals are contacted by the pharmacy team to schedule an appointment. Appointments occur at UMA during a time their PCP is also in clinic to allow for close collaboration and signature of opioid prescriptions. During the visits, the clinical pharmacy team comprehensively evaluates patients’ pain and impact on activities of daily living and manages pain medications per protocol. Patients are discharged from the CPC when the patient has deemed their pain control satisfactory, or the pharmacist and PCP determines it is not appropriate to escalate therapy further.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Outcome measures will be recorded before and after the intervention and include 1) patient reported pain scores, satisfaction with pain control regimen, adverse effects, timing of and how they take their pain medications in comparison to the prescribed instructions, and impact on activities of daily living; 2) total daily dose of opioids in morphine equivalents; and 3) number of non-opioid adjunctive pain medication changes. To compare pre- post-intervention differences, the McNemar Test will be used for discrete data and Wilcoxon Rank Sum for continuous data.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): From November 3, 2014 to January 2, 2015, 332 patients were determined to be eligible by the pharmacy team. Of the eligible patients, 30 % of referrals were accepted by the PCP, 5 % denied and 64 % awaiting referrals. A total of 42 calls to schedule appointments have been made and 21 appointments have been confirmed; 4 patients denied appointments with the CPC, 13 did not answer and 4 asked for a call back later or their phones were disconnected. Of the 6 patients who have attended their first CPC visit, 7 changes were made to their pain regimen; 2 included adding a long acting opioid and 5 involved optimizing non-opioid adjunctive medications. Only one patient has had a follow up visit and 4 patients either cancelled or no showed to their initial visit.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A small pilot with patients of 3 providers was critical to problem solving logistics to ensure feasibility and efficiency. The logistics of obtaining written prescriptions for opioids evolved over the course of the pilot. The pilot also served to solidify data collection tools that were feasible to complete during office visits. Close communication with providers regarding clinic flow and processes was very helpful. Careful messaging to patients about the CPC to ensure acceptability and early buy in from stakeholders, including clinic and institution leadership and providers was key to the early successes of this service. Continued process mapping and PDSA cycles will be conducted as the CPC clinic expands. Additional efforts are needed to identify and address barriers to PCP acceptance and patient engagement. Further, careful monitoring of appointment cancellation and no shows will be performed to ensure patients are seen.

A SURVEY TO ASSESS PATIENT EXPERIENCES IN PATIENT-CENTERED MEDICAL HOMES FOR PATIENTS WHO ARE HOMELESS AND FORMERLY HOMELESS Stefan Kertesz^{2, 3}; Erika L. Austin¹; Calvin Elam²; Nancy Johnson². ¹Birmingham VAMC, Birmingham, AL; ²Birmingham VA Medical Center, Birmingham, AL; ³University of Alabama at Birmingham, Birmingham, AL. (Tracking ID #2198318)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Public funders such as the US Department of Veterans Affairs (VA) and the Department of Health and Human Services (HHS) fund primary care medical homes for homeless individuals, but a practical method to assess this population's health care experiences has not been demonstrated.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Patient experience surveys ask whether the care received embodies core expectations such as accessibility, coordination, continuity and trust. This team has published a 33-item survey based on qualitative and quantitative psychometric research with 563 homeless primary care patients (Primary Care Quality-Homeless, PCQ-H). The PCQ-H is shorter than the Consumer Assessment of Health Plans (CAHPS) PCMH battery, easier to read (7th vs 9th grade), and offers 4 scales (Relationship, Accessibility/Coordination, Perceived Cooperation among Caregivers, Homeless-Specific Needs). Each scale has similar or better internal reliability to comparable CAHPS scales and reflects tailoring for homeless-experienced patients. However, practical deployment of this survey outside a research context requires answering key questions related to feasibility and acceptability, including: 1. For homeless and formerly-homeless patients, what response rates result from mailed surveys compared to surveys handed out by clinic staff? 2. How do patients experience the survey with regard to: time required to respond; ease of responding; privacy concerns; and, who they think about when asked about their "primary care provider" in a multi-provider system such as VA? 3. Do care ratings differ when surveys are mailed (with no remuneration offered) compared to responses obtained from face-to-face administration in the research setting (with remuneration)?

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Setting: Birmingham VA Medical Center's Homeless Patient-Aligned Care Team (H-PACT), one of 50 specialized VA primary care teams for the homeless. The PCQ-H survey (33 items and 10 supplemental questions regarding feasibility/acceptability) was mailed two times (one month apart) to 296 patients using the last-available address. Clinical staff were also asked to distribute the same survey in clinic.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We recorded response rates and feasibility/acceptability responses; we also compared care ratings among the current H-PACT respondents to 150 homeless and formerly-homeless veterans surveyed previously under research conditions (face-to-face after informed consent, with remuneration) in 2012.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Response rates were 15 % ($n=45$) for the first mailing and an additional 10 % ($n=28$) for the second mailing. Clinical staff reported it was impractical to hand out surveys, and only 13 completed surveys were obtained from the clinic. The 86 total responses comprised 29 % of the eligible patient panel. Most patients reported the survey required <10 min to complete (64 %) and preferred to receive it by mail (78 %). Just 7 % reported "frequently" feeling confused by the questions, although 32 % said they did not trust that responses were confidential. For questions about a "primary care provider," 54 % reported that they thought about "several persons working on a team" when responding. When compared to mean scores obtained through surveys administered by a research assistant, mean care ratings obtained on the mailed survey were not significantly different (all $p>0.10$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A recently-published survey of homeless patients' primary care experiences was easily deployed in a clinical, non-research setting. A 29 % response rate, in the absence of remuneration, is lower than what is obtained from non-homeless veterans in VA's standard primary care (47 %, according VA's Director of Surveys). However, it is higher than is obtained after VA psychiatric hospitalization (22 %). Most respondents preferred the opportunity to respond by mail, while clinical staff found it impractical to hand out surveys. Interpretation of results requires considering that some patients will consider a team rather than a single individual when answering questions about "your primary care provider." Dedicated homeless clinics such as those funded by VA and HHS should consider this instrument as a practical tool to assess primary care for homeless and recently-homeless patients.

AVOIDING AVOIDABLE CARE: WEEKLY "M&M" REVIEW REDUCED ED VISITS IN A PACE PROGRAM Uma S. Tadepalli^{1, 2}; Maren Batalden^{1, 2}; Anne Fabiny^{1, 2}. ¹Cambridge Health Alliance, Cambridge, MA; ²Harvard Medical School, Boston, MA. (Tracking ID #2198664)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Comprehensive care processes are ill-described, and their effectiveness in reducing utilization is unclear.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The objective of this innovation was to describe and evaluate a new process for individual patient care plan development that would reduce ED and hospital utilization.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): At a single-center Program for All-inclusive Care of the Elderly (PACE) in urban Massachusetts, we implemented a weekly interdisciplinary "Morbidity and Mortality" review of all program participant ED visits and hospital admissions using a root cause analysis instrument, and developed individual care plans based on this review. Participants included a rolling panel of approximately 290 community-dwelling, nursing home eligible, Medicare/Medicaid patients aged 55 and older.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We measured ED visits and hospital admissions per member per quarter for 1.5 years before and after implementation of "M&M". We trended mean risk score of the rolling patient panel during this time as a measure of overall population complexity.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The mean ED visit rate decreased from 9.9 % prior to the intervention to 6.0 % after the intervention was begun; the mean hospital admission rate decreased from 7.1 to 5.0 %. The mean risk score increased, but did not change significantly. Focus group analysis with M&M committee members suggests several mechanisms by which this intervention led to improvements and changed the program culture: (1) illumination of the gap between the theory of the program and actual program operations, including several ways in which patients, families and staff lacked basic understanding of care alternatives, (2) an expanded ability to see patients as whole people and identify novel ways to add value to patients' care within the larger context of their lives, (3) increased confidence in improvement capacity of program staff, and (4) development of a shared mental model of the program through cultivation of relationships among interdisciplinary program staff.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Using formal root cause analysis to inform care plan development significantly reduced ED utilization in a very complex patient population. Although developed within a PACE site, this method of review and intervention would apply to any primary care practice working to avoid avoidable care for complex patients.

DEVELOPING A LANGUAGE ACCESS CLINIC (LAC) FOR PATIENTS WITH LIMITED ENGLISH PROFICIENCY (LEP) Lucero C. Chueca Villa¹; Cheryl Miree²; Christine L. Joseph². ¹Henry Ford Hospital, Detroit, MI; ²Henry Ford Health system, Detroit, MI. (Tracking ID #2200336)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Improving health care access and quality of care for patients with Limited English Proficiency requires implementing language access services within health care settings.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Explore the feasibility of establishing a Language Access Clinic (LAC) for Hispanic/Latino patients with limited English proficiency (LEP) and patients who prefer to communicate about their healthcare in Spanish.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The LAC was developed as part of the Internal Medicine outpatient clinic and Henry Ford hospital Main campus in Detroit Michigan. It started initially as a 4 h block every other week, but given demand it was increased to 4 h block every week and currently is an 8 h block every week.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We established a Spanish LAC for patients who indicated LEP or a preference to receive their healthcare in Spanish. To evaluate the LAC, we collected data from 3 sources: **Staff Survey:** Clinic staff of Henry Ford Hospital (HFHS), Internal Medicine, Central Campus, were asked to complete a 37-questions survey about interpreter services used and needed. **Patient Survey:** Patients visiting the LAC were asked to complete a survey that asked about experiences before and after being seen in the LAC. **Convenience Sample (Non-LAC):** For a comparison group, encounter databases were used to obtain a listing of patients who had identified themselves as being of Hispanic/Latino descent and had been seen by a HFHS physician. Patients were mailed a survey that was identical to the two-part survey completed by patients in the LAC. **Financial Analysis:** A financial analysis was also performed.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): **Staff Survey** A total of 33/54 (61 %) staff members responded to the survey. Results are shown in Table 1. Seventy-nine percent of respondents reported encountering a patient with LEP at least once a month, and 64 % reported requiring an interpreter. A total of 24 % of respondents reported miscommunications with patients due to language differences occurring at least once per month, with 30 % asking a patient's adult friend or relative to interpret. **Patient Survey: (before LAC)** A total of 78 patients visited the LAC between September 19, 2012 and January 29, 2014 10 % of LAC patients versus 5 % of non-LAC patients reported previously (pre-LAC) having a "bad reaction" to medication due to language problems. Seventeen percent of LAC patients versus 3 % of non-LAC patients reported previously having trouble understanding medical instructions and advice. **Patient Survey: (After LAC)** LAC patients were more likely to feel comfortable, understand materials, and communicate during their visit when compared to non-LAC patients. LAC patients also reported feeling that they were treated with respect more so than non-LAC patients

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Results of our evaluation suggest that patients drawn to the LAC may have been those that had experienced problems with healthcare-related communications previously. Compared to a convenience sample, LAC patients reported better communication and satisfaction in the LAC experience than non-LAC patients. Increasing the number of bilingual staff at HFHS could make our healthcare system more attractive to Latino patients with LEP or who prefer to receive their healthcare in Spanish. A more rigorous study is needed for further exploration and to confirm these preliminary results. There is need as the LAC clinic started initially as a 4 h block every other week, but given demand it was increased to 4 h block every week and currently is an 8 h block every week. Sustaining and expanding the LAC at HFHS is feasible with minimal resources. Required are bilingual providers and support staff. Factoring in staff and supplies, the approximate cost of each clinic (4 h time slot) was \$98.00. Approximate revenue generated is \$450 per 4 h clinic slots (6 patients @ \$75 each), for a financial gain of \$351.00. More patients can be accommodated into existing schedules without increasing staff hours which would generate more revenue. In addition, the LAC patient navigator and nurse assistant were hired on a contingent basis. With the addition of bilingual fulltime staff for General Internal Medicine, perhaps a cost savings could be realized.

ENHANCING RESILIENCE TO PROMOTE VA PATIENT-CENTERED MEDICAL HOME TRANSFORMATION AND THE UNTOWARD EFFECTS OF THE NATIONAL ACCESS CRISIS Carole Warde^{1,3}; Wendell T. Ching^{2,3}; Robin Sohmer². ¹Greater Los Angeles VA Health System, North Hills, CA; ²VA Sepulveda Amb Care Ctr, North Hills, CA; ³David Geffen School of Medicine at UCLA, Los Angeles, CA. (Tracking ID #2194553)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): While successful transformation to a patient-centered medical home necessitates that front-line care teams possess resilience to thrive during ongoing change and avoid burnout, little attention is paid to this aspect of system transformation.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The site quality council initiated a 6-step practice innovation to identify and implement interventions to maintain or improve PACT teamlet members' job stress, personal burnout and job satisfaction.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Setting and Participants: A large VA multispecialty outpatient clinic with 12 primary care teamlets. Each teamlet is responsible for caring for approximately 1200 Veterans and consists of a full-time primary care provider (PCP), a RN/care manager, a LVN and a medical services assistant (MSA). The site is currently in the third year of transformation to a patient-centered medical home called PACT (patient aligned care teams). Many quality improvement (QI) initiatives to promote primary care practice transformation are initiated by the Quality Council (QC), which is an interdisciplinary team of site leaders, clinicians and patient representatives. This pilot innovation is planned to continue for a year. The process includes: **1. Form a Resilience Steering Committee (RSC):** the QC invited volunteer PACT teamlet members from each discipline to lead the program. A facilitator and practice coach were also part of this group and they met weekly or biweekly. Statistical support was provided by the Veterans Assessment and Improvement Laboratory (VAIL). **2. Conduct a Needs Assessment:** the RSC used a short survey and focus group to conduct the needs assessment. Survey questions were selected from previously validated surveys (Linzer et al.). The RSC reviewed and categorized results into three categories (demand, control and support). **3. Create Buy-in:** Results and potential first improvements were presented to all 12 teamlets and the site leadership team at 2 large practice meetings. The facilitator moderated a large group discussion for feedback and selection of targeted interventions. **4. Initiate Improvement**

Processes: The QC and RSC and interested staff members voluntarily initiated improvements identified at the all staff meetings and at the RSC meetings. **5. Share Information:** In addition to serving as a venue to implement resilience initiatives, the monthly all-staff meetings were planned to share resilience-related resources, stories and best practices. **6. Assess Improvement:** surveys similar to those used in the needs assessment were collected quarterly to assess staff burnout, job satisfaction and stress and reactions to interventions. RSC members also collected qualitative feedback informally from their teamlet colleagues.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We used previously validated tools to measure our success: job stress, job satisfaction and burnout were our primary indicators. We also measured perceived control over interruptions and pace of work, teamwork efficiency and leadership values alignment with staff.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Needs Assessment Results: Workload demands related to panel size and walk-in patients. Control needs related to work interruptions and pace, staff job accountability, missing staff, and equipment maintenance. Support needs related to teamlets covering for each other, values alignment and communication with leadership, professional growth opportunities, and change management. Improvement Processes: First quarter interventions related to demands and control included: the creation of a daily walk-in teamlet to cover unscheduled patient visits; initiation of protected time for MSAs; and leadership attention to equipment maintenance. Support needs were addressed by scheduling monthly all-staff meetings to communicate with site leaders and conduct teamlet-communication exercises. Anonymous suggestion boxes were placed in clinical areas and input reviewed by the RCS and QC. Unexpectedly, during the second quarter of this innovation, the nationwide VA access crisis occurred, which led to the cancellation of the all-staff meetings and the first quarter interventions. Baseline rates of high job stress and satisfaction were 63 and 46 %; high job satisfaction rates trended toward improvement to 67 % during the first two quarters. Burnout rates decreased with the initiation of the first quarter's interventions from 57 to 25 % ($P < .01$) and perception of control over work interruptions improved from 24 to 50 % ($P = 0.05$). After the cancellation of the main resiliency-related interventions, the second quarter burnout rates and perceived control returned back toward baseline.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The process to improve PACT teamlet resiliency in this innovation was successful at involving front-line PCMH care team members in improvement efforts. Teamlet member burnout rate and perceived workplace control appear to be sensitive measures to monitor the initiation and withdrawal of practice improvements related to resilience.

MEDICAL STUDENT INSULIN TITRATION PROGRAM: A PHONE-BASED OUTREACH FOR PATIENTS WITH UNCONTROLLED DM Emily Knudsen²; Ingabire Balinda²; Emily Richardson²; Svetlana Goldman¹; Donna M. White¹; Mohan Nadkarni¹; Joel Schectman¹; Ira Helenius². ¹UVAHS, Charlottesville, VA; ²University of Virginia, Charlottesville, VA. (Tracking ID #2194639)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Does a medical student run telephone-based outreach program that includes insulin titration improve glycemic control for ambulatory patients with DM?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): We initiated a quality improvement project with the objectives of 1) improving hemoglobin A1c (HbA1c) in patients with poorly-controlled diabetes and 2) fostering relationships between medical students and patients.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We developed a telephone based insulin titration program in a large outpatient general medicine clinic that provides care to a primarily underserved and indigent population of patients at University of Virginia Medical Center. Medical students were recruited to design and run the program with oversight from two Internal Medicine attendings and a pharmacist/DM educator. Prior to starting the program the students attended training sessions on diabetes and its management run by DM educators. Students received training in motivational interviewing skills and became more comfortable utilizing these skills in engendering lifestyle and behavioral changes with patients. A previously used insulin titration protocol was adapted for the program to allow students to adjust patients' insulin doses over the phone. Patients with uncontrolled DM (HbA1c > 8 %) on long acting insulin were referred to the program by providers in the clinic. Three medical students began enrolling and calling patients in July 2014. In the weekly telephone conversations with patients, student volunteers discussed trends in blood glucose (BG) readings, diet and exercise. Healthy lifestyle modifications were stressed in the conversations, and potential barriers to improved DM selfcare were addressed. Volunteers also used the insulin titration protocol to adjust doses as needed based on weekly average BGs.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Pre- and post-program HBA1c, initial age and BMI, number of weeks enrolled in the program and number of weeks of successful calls were determined for each patient.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Program data from July 1, 2014 through November 1, 2014 were analyzed. Forty-seven patients were included in the analysis. The mean BMI was 36 kg/m² ($n=47$), mean age was 57 years ($n=45$), mean initial HBA1c was 10.2 % ($n=44$) and mean follow-up HBA1c was 8.8 % ($n=31$). The mean time between initial and follow-up HBA1c was 135 days. Among the 28 patients with pre and post values, the difference between initial and follow-up HBA1c was -1.57 % ($p=0.0007$). Students' attempts to reach patients per phone were successful 47 % of the time. Patients were successfully reached an average of 6.9 out of 14.6 weeks enrolled. Univariate regression showed that the magnitude of the reduction in HBA1c was significantly associated with the number of times the patient was reached by phone ($p=0.01$), but not associated with the number of weeks enrolled in the program ($p=0.91$). To date we have only anecdotal data on the effect of the program on medical students. Students report that they felt more comfortable with adjusting insulin and more importantly, that they have a better understanding of the struggles facing underserved patients. Some students have voiced frustrations about how difficult it is to reach patients per phone.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A medical student run, phone-based outreach program for patients with uncontrolled DM using an insulin titration protocol can improve glycemic control. The patients who reap the most benefits from the program are those who are reached by phone most frequently; those patients who were not reached often did not get the benefit of reduced HBA1c even if they were enrolled in the program.

MULTIDISCIPLINARY APPROACHES TO IDENTIFY CAUSES FOR READMISSION FOLLOWING CORONARY REVASCULARIZATION Vishal Patel¹; Daniel J. Elliott². ¹Christiana Care, Newark, DE; ²Christiana Care Health System, Newark, DE. (Tracking ID #2195944)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Despite intense focus on the need to reduce readmissions, surprisingly little is known about the factors which lead to readmissions. Understanding these factors could help more appropriately target interventions to improve care transitions.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To identify factors leading to all-cause non-elective 30 day readmissions following coronary re-vascularization; and to use these findings to implement interventions to circumvent these readmissions.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We conducted a structured review of readmitted patients at a single tertiary care institution from May 2013 to present. All patients were participating in an integrative care management program. A multi-disciplinary team reviewed chart audits and patient interviews using standardized tools. A physician team determined preventability and factors that contributed to the readmission; and lessons learned were used for ongoing quality improvement.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Information from the index visit, discharge process, outpatient course, and readmission were collected and this was used to create a readmission model. A quantitative model was created to determine readmission risk potential and this information was distributed to the case managers to help allocate resources appropriately during and after discharge. In addition, other measures such as patient quality of life and symptoms were monitored.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We reviewed 134 patients with an unplanned 30 day readmission. Thirty-five percent of the patients had CABG and 65 % had PCI. The chief complaint on readmission was chest pain or shortness of breath for 75 % of the cases. Thirty-eight percent were judged as potentially preventable. Of the preventable readmissions, 60 % could have been prevented with actions prior to the initial discharge. The major factors contributing to readmission for all cases by percentage include difficulty managing symptoms at home (61 %), continuity of care including appropriate follow-up (40 %), and lack of disease monitoring (20 %). In 25 % of the cases, we identified an opportunity for the care management team to improve engagement with the patient.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A significant portion of readmissions were considered to be preventable with intervention,

many of which relate to improved systems of care delivery across the spectrum of care. This type of multi-disciplinary structured case review can identify opportunities for ongoing improvement of care delivery following coronary revascularization. Since implementation, we are now focusing on improvements in care transitions and placing a greater focus on home health care. We have incorporated more tele-health into the home to have greater meaningful contact with the patient and will continue to monitor if this will improve patient outcomes and readmission rates for preventable hospitalizations.

POST-DISCHARGE CARE COORDINATION FROM THE SAFETY NET MEDICAL HOME: A HEALTH WORKER PHONE CALL INTERVENTION Elizabeth Imbert⁵; Jessica Beaman⁵; Susan Wlodarczyk⁵; Claire K. Horton⁵; Hali Hammer⁵; Anna Robert¹; Ellen Chen¹; Catherine James¹; Lydia Leung²; Michelle Schneidemann⁴; Pineda Iveh¹; Karishma Oza²; Larissa Thomas⁶; Anne Rosenthal¹; Marina Mancillas¹; Elizabeth Davis⁵. ¹San Francisco Department of Public Health, San Francisco, CA; ²San Francisco General Hospital, San Francisco, CA; ³UCSF SF General Hospital, San Francisco, CA; ⁴UCSF/SFGH, San Francisco, CA; ⁵University of California San Francisco, San Francisco, CA; ⁶University of California, San Francisco, San Francisco, CA. (Tracking ID #2199401)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): There are 35.1 million discharges annually from hospitals around the US and approximately 18 % of these result in readmission.¹ Safety net hospitals have higher readmission rates likely attributable to serving patients with lower socioeconomic status and higher levels of comorbidities.² Many studies have evaluated preventability of readmission and on average only 23–30 % of 30-day readmissions appear to be avoidable.³ With the new Medicare penalty for readmissions, hospitals have focused on improving care coordination as patients transition from inpatient to outpatient settings in an effort to reduce readmission and improve patient outcomes.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): At San Francisco Health Network Primary Care, we implemented a primary care based post-discharge phone call by a health worker to 1) improve care coordination upon discharge from San Francisco General Hospital; 2) increase the percentage of post-hospital discharge appointments attended within seven days of discharge; 3) and decrease readmission rates. To meet these goals, we iteratively refined the health worker workflow and script at four primary care clinics and then spread it to eight other primary care clinics.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In late 2013, a needs assessment was performed to identify rates of admission, readmission, and post-hospital discharge appointments for patients in pilot primary care clinics. In October–December 2013, our first Plan-Do-Study-Act (PDSA) cycle piloted a post-discharge phone call at four primary care clinics. Each business day, the health worker at each clinic queried the electronic medical record to identify patients who were discharged from San Francisco General Hospital, made them a follow up appointment if they did not already have one, and called the patients. The phone call script content varied among the four pilot primary care clinics. In February 2014, PDSA cycle #2 took lessons learned from one of the sites and modified the phone script to include questions regarding medication issues, which triggered nursing involvement if positive, and information about how to access the clinic should symptoms worsen. In July 2014, PDSA cycle #3 focused on ensuring follow-up appointments were made within 7 days of hospital discharge. In July–August 2014, we integrated scripts across all four sites creating a uniform script and protocol that we then disseminated to eight additional health centers through a network-wide training. In October 2014, patients were surveyed over the telephone regarding their experiences with the post-discharge follow up phone call. Using this information, in December 2014 PDSA cycle #4 involved a revision of the script to include a review of medications and clarification of whether the patient has enough medication to last until the follow appointment; a screening for red flag signs, which triggers nursing involvement if positive; a teach back component reviewing content of phone call; and a description of the purpose of the post-hospital discharge appointment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The metrics used to evaluate this program include percentage of primary care clinic patients attending post-hospital discharge appointments within 7 days of discharge; percentage of readmissions to SFGH; and percentage of post-discharge phone calls requiring nursing involvement.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): During the 1 year since implementation, there has been a steady increase in the percent of patients attending post-hospital discharge appointments within 7 days from 36 to 42 % in General Medicine Clinic and 33 to 52 % in Family Health Center.

Percentage of patients attending post-hospital discharge appointments did not change at the other two pilot sites due to staffing issues which limited implementation of phone calls. Overall, percentage of patients attending post-hospital discharge appointments has increased by 32 to 42 % across San Francisco Health Network. The readmission rate has been unchanged since our implementation. The percentage of post-discharge phone calls requiring nursing involvement is 0.05 %.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Post-discharge phone calls by health workers can improve post-hospital discharge appointment attendance in the safety net setting. Although our readmission rate has not changed, we suspect this is due to a rise in readmission rates at San Francisco General Hospital as well as the fact that our data for readmission rates is only current as of June 2014 and does not reflect our most recent PDSA cycle which included our telephone script modification. Our low nurse involvement reflects that this intervention can be done by a health worker however our last script modification was performed with a focus on triggering nurse involvement when appropriate. The telephone call protocol implemented in this study could be easily transferred to other outpatient settings and may serve as one method of improving safety and ensuring close follow-up for patients during their transition from the inpatient to outpatient setting.

THE BUDDY SYSTEM IN DIABETES SELF-MANAGEMENT: A PILOT PROJECT Natasha Parekh²; Rachel Hess³; Marcus A. Poindexter¹; Elena Jiménez Gutiérrez²; Gary Fisher². ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA; ³University of Utah, Salt Lake City, UT. (Tracking ID #2196224)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Prior work has examined the use of support programs with hired or volunteer peers for the management of chronic diseases including diabetes, tobacco abuse, HIV, obesity, and depression, but the use of patients' existing social support has not been well-investigated; with this in mind, could an outpatient program that takes advantage of patients' existing social support (i.e., a Buddy System) improve diabetes self-management?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): We designed a single-center, prospective feasibility project called the "Buddy System" for high-risk patients with diabetes in our general internal medicine clinic. The goals of this pilot project were: 1. To assess the feasibility of such a system in terms of (a) patient satisfaction with and desire to continue the program, (b) challenges and barriers for program success, and (c) possibility of expanding this to a larger diabetic population. 2. To assess the impact of such a system on (a) hemoglobin A1c (HbA1c), (b) blood pressure, (c) body mass index (BMI), and (d) health care utilization (emergency room visits/hospital admissions).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The Buddy System is an outpatient-based intervention conducted by internal medicine residents, a clinic social worker, and a clinic diabetes educator. The study team enrolled patients with uncontrolled diabetes (HbA1c > 8.5 in the previous year) from our clinic population. Patients participating in this trial identified a "buddy" within their social support network who was trusted to be a supporter of their health. The patient and buddy then attended an education session by the study team on diabetes self-management, challenges, and goals. They chose from a "menu" of support options on ways that the buddy could help the patient with self-management. Some examples included time commitments to exercise together, cook fresh meals together, and assist with obtaining medications and attending medical appointments. The patient and buddy were then followed up at 1 month (by phone), 3 months (in person), and 6 months (in person) to assess outcomes.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The study team used patient and buddy survey data to assess how the buddy system functioned and to evaluate for areas of improvement, satisfaction, and challenges to system implementation, as well as perceived effects on stress, diet, exercise, and the patient-buddy relationship. The team also used medical chart review to assess objective outcomes including HbA1c, blood pressures, BMI, emergency room visits, and hospitalizations.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Seventeen patient-buddy pairs initially enrolled in the project (mean age 53 years old, 82 % female patients). Ten pairs (59 %) completed the program. Of those who completed the program, 100 % of patients and buddies were very much or mostly satisfied with the Buddy System and would be willing to continue it in the future. Reasons for not completing the program included 1 patient death, 3 buddy hospitalizations, and 1 patient transportation issue; only 2 patients were not willing to continue. Among those who completed the project, there was a decrease in median HbA1c from 9.3 to 8.7 at 6-months, though not statistically significant ($p=0.095$). There was no significant difference

in BMI ($p=0.59$), perceived stress score ($p=0.75$), and hospitalizations/ER visits ($p=0.50$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Interventions that address health outside of the clinic are necessary to improve our patients' health. This pilot project suggests that a Buddy System is feasible for high-risk patients with diabetes in our clinic. Considerations to prevent dropouts in the future include the use of technology to remind patients/buddies of their goals, more logistical support with appointments, and exclusion criteria for buddies to ensure that buddies are functionally able to support patients. Although a decrease in HbA1c was not statistically significant, this data can be utilized to calculate power calculations and inform future work in this area. Thus, taking advantage of patients' existing social support systems could be of value to self-management in a high-risk population of patients with diabetes.

THE USE OF SNAP SURVEYS TO EVALUATE, IMPROVE AND ENGAGE RESIDENTS IN CLINICAL OPERATIONS, TEACHING AND QUALITY IMPROVEMENT Scott Joy¹; Anjali Dhurandhar². ¹The Colorado Health Foundation, Denver, CO; ²University of Colorado School of Medicine, Denver, CO. (Tracking ID #2195029)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): It is important for faculty and administrators in academic medical practices to obtain routine, timely feedback from residents on their satisfaction with clinical operations, faculty teaching and quality improvement efforts that are ongoing within the clinical training environment to make meaningful changes to improve the resident experience and perceptions of the practice of general internal medicine.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): In the era of online, web-based status updates and instant feedback, "pulse surveys" or "snap polls" are gaining more widespread use in places of employment. The purpose of these short monthly, weekly or daily polls is to collect data on how team members actually feel about their work environment and to recognize problems promptly and address common issues of concern. It has not been reported how these types of surveys could be applied within the outpatient clinical practice environment in a general internal medicine training program.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We sought to identify key measures that were often areas of past concern for GIM residents which included team huddle, clinic rooming process, medical assistant performance, access to attendings for patient sign-outs, quality and content of pre-clinic educational conferences, overall perception of the quality of faculty teaching, and the perceived value of participating in ongoing QI projects. Our GIM residents are on a 4+1 schedule, rotating in the GIM outpatient clinic for 1 full week out of 5 weeks. On the Friday of each clinic week, a faculty member leads a group discussion, asking each residents to provide a specific number regarding how they feel about each of the areas of evaluation described earlier on a 1–10 Likert scale (0-poor, 10 excellent). If the value is not a 10, residents are asked to provide a specific suggestion for improvement that would have made the area of evaluation become a 10. These values and comments are documented by the faculty member leading the survey session and entered into an excel spreadsheet for analysis. These feedback sessions on average take less than 15 min to complete as a group. Findings and observations gleaned from the resident feedback are discussed at regularly weekly faculty/staff meetings, and solutions to areas of concern are addressed and appropriate changes are made in clinical operations or teaching efforts.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Create a culture of openness and trust within the clinic and between residents and clinic leadership. Proactively demonstrate to residents, on a weekly basis, that their feedback is welcome and valuable suggestions will be acted upon by clinical leadership to improve their learning experience and the patient experience of care. Provide faculty with an opportunity to train residents on how to provide constructive comments and feedback related to clinical operations and teaching effort, insisting upon specific suggestions to improve performance in any category that is not scored a 10.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Summary data from 07/18/2014 to 12/15/2014: Metric: Average Score (Range of Scores) Huddle: 8.3 (7–10) Rooming: 8.9 (8–10) MA/Front Desk Performance: 9.8 (9–10) Access to Faculty: 9.0 (6.5–10) Quality of Pre-Clinic Conference: 9.1 (8–10) Overall Quality of Teaching: 8.8 (6–10) Value of QI Project: 7.8 (1–10)

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A weekly, brief, "snap survey" is a simple tool that is an effective means for gathering feedback from residents on their perceptions on clinic operations and teaching experience

within a GIM academic practice. The residents are also given an opportunity to voice and discuss concerns and or make suggestions with a faculty member on a regularly scheduled and timely basis to improve their overall clinical and teaching experience. A potential limitation is that the snap surveys are not anonymous, are administered by a faculty member and are held as a group. As a result, residents may not always feel comfortable expressing some of their thoughts. However, this provides a teachable moment for the resident to learn how to provide feedback as a group and to hear what their peers comments/suggestions are, and to provide the faculty member an opportunity to teach principles of effective feedback generating constructive comments that can be acted upon by administration to add value to the overall teaching experience for the residents. Because of the frequent feedback sessions, suggestions for improvement can be quickly addressed and applied to enhance the clinical and teaching experience for GIM residents.

USING AN EVIDENCE-BASED, SYSTEMATIC APPROACH TO IMPROVE BLOOD PRESSURE CONTROL IN STAGE 2 HYPERTENSIVE PATIENTS THROUGH A MULTIDISCIPLINARY TEAM-BASED MODEL Sarah Schenck; Pooja Dogra; Edward Ewen; Julie Silverstein. Christiana Care Health System, Newark, DE. (Tracking ID #2195948)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Clinical management of patients with hypertension is often complex, particularly in an urban population with a high burden of chronic illness due in large part to fragmented care, lack of incorporating evidence-based guidelines into practice, patient non-adherence and social barriers.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To reduce systolic blood pressure by 10 mmHg in 20 % of Adult Medicine Office (AMO) and Internal Medicine Family Practice (IMFP) patients with Stage 2 hypertension

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The AMO, the Internal Medicine residency teaching clinic, and the IMFP take care of 7500 patients who are mostly underinsured, under-resourced and suffer a high burden of chronic disease. In the AMO and IMFP, 48 and 30 % of the patients respectively have hypertension. We designed a program, AMO-HTN, to address patients with Stage 2 hypertension (blood pressure >160/100 based on rolling 12 month time-averaged blood pressures) who had been seen in the office at least once in the previous 12 months. Our program was developed based on 3 principles: o Population health approach: to use clinical staff in roles appropriate for their training. o Evidence-based medicine: to determine best practice (STITCH chosen over JNC-7) to develop clinical algorithm. o Patient engagement in self-management: aided by distribution of home blood pressure monitors. We developed a clinical algorithm based on guidelines, literature review, relevant medication formularies and costs. We incorporated resident and faculty education into the Preclinical Pearls curriculum. AMO-HTN patients were given dedicated appointments for hypertension evaluation and management, and standardized hypertension templates were used for documentation of these visits. Our multidisciplinary team included faculty and resident physicians, a clinical pharmacist, a nurse and medical assistants. The intervention period was 6 months (10/1/2012-4/30/2013).

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): • To reduce systolic blood pressure by 10 mmHg in 20 % of Adult Medicine Office (AMO) and Internal Medicine Family Practice (IMFP) patients with Stage 2 hypertension in 6 months. • Comparison of results by visit type o No visit o AMO-HTN visit o Other visit type

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): • A total of 209 patients were enrolled in the AMO-HTN program • A 10 mmHg reduction in systolic blood pressure was seen in 26.8 % of the overall enrolled population • The average reduction in systolic blood pressure was 5.04 mmHg • Patients who had an office visit during the intervention period were 2 (AMO) to 4 (IMFP) times more likely to achieve a 10 mmHg reduction in blood pressure

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): • Blood pressure can be reduced in patients with Stage 2 Hypertension by a multidisciplinary team-based approach utilizing an evidence-based algorithmic model of care and patient self-management. • Having an office visit, whether it was designated for hypertension or not, was associated with blood pressure reduction. • The study period was short and BP management is an iterative process that requires time for sequential interventions and follow-up measurements.

A MULTIDISCIPLINARY EFFORT TO IMPROVE UTILIZATION OF RESOURCES FOR PATIENTS WITH MORBID OBESITY IN THE PRIMARY CARE CLINIC Stephen C. Chow. Carolinas Medical Center, Charlotte, NC. (Tracking ID #2196726)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): This quality improvement project aimed to increase morbid obesity counseling and referrals to relevant resources in those with a BMI of 40 or higher seen at Myers Park Internal Medicine Clinic during January 2014.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To increase awareness of morbid obesity and the resources to address it in the outpatient setting amongst residents. To increase the amount of morbid obesity counseling and referrals to resources for patients with BMI of 40 or higher in clinic. To address morbid obesity during clinic visits in hopes that weight loss will improve longterm clinical outcomes of other chronic diseases.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): This project was conducted at Myers Park Internal Medicine Clinic in Charlotte, North Carolina, which is the outpatient training site for the Carolinas Medical Center internal medicine residency program. It is an urban clinic with a high percent of patients who are either uninsured, have Medicaid, or have Medicare. Patients were included if they were seen in the general internal medicine clinic by either a resident or attending and had a BMI of 40 or higher. Patients were excluded if they were there for a hospital follow-up visit. In January 2014, we introduced a brightly colored handout to physicians to use with their patients with BMI of 40 or higher. The handout included counselling on diet and exercise, multiple referral options, and space to write in additional recommendations. After collaborating with our quality improvement team, clinic nurse manager, clinic physician director, and clinic nurses, we developed a system where nurses would pull this handout on all patients they roomed with a BMI of 40 or higher. The physician would then fill it out and place it back in the chart. The nurse then copied the handout, keeping the copy for us, and giving the original to the patient to take home.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We measured obesity counseling, dietitian referrals, YMCA referrals, aquatic therapy referrals, and bariatric clinic referrals in January 2013 (pre-intervention) and again in January 2014 (during intervention). Electronic charts of all patients with BMI of 40 or higher seen at Myers Park Internal Medicine during these months were identified through use of the electronic medical record. Chart reviews and data extraction were performed to look for the counselling and referrals listed above.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): One hundred forty-seven patients in January 2013 and 135 patients in January 2014 met our inclusion and exclusion criteria. Obesity counseling rose from 53.1 % (78/147) to 72 % (97/135) of patients in the pre-intervention and intervention groups respectively. This increase was highly significant, with p-value of 0.001. Dietitian referrals nearly tripled from 6.8 % (10/147) to 18.5 % (25/135), also with highly significant p-value of 0.003. Aquatic therapy referrals increased from 2 % (3/147) to 6.7 % (9/135), with a trend toward significance with a p-value of 0.056. YMCA referrals did not significantly change, at 6.8 % (10/147) in 2013 and 7.4 % (10/135) in 2014 (p-value 0.843). Bariatric Clinic referrals also did not significantly change, from 3.4 % (5/147) in 2013 to 1.5 % (2/135) in 2014 (p-value 0.450).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): We were able to increase obesity counseling, dietitian referrals, and aquatic therapy referrals for our morbidly obese clinic patients, by using a simple one-page handout that addressed obesity counseling and referrals to resources through a nurse-physician collaboration. In our initial survey of residents, 90 % (26/29) identified time constraints as a barrier to addressing obesity with patients in clinic. We believe this intervention provided an efficient and low-cost way to address obesity with patients. Although this was a relatively small sample size in one clinical setting, we believe it could be implemented in a wide variety of primary care practices. As the majority of our obese patients have medical problems associated with their obesity, such as diabetes, hypertension, heart disease, and osteoarthritis, every intervention we can make to decrease obesity is a step toward preventing and treating these diseases.

A MULTIDISCIPLINARY TEAM-BASED MODEL UTILIZING THE DIABETES EDUCATOR TO IMPROVE DIABETES OUTCOMES IN PRIMARY CARE

Georgia Kulina¹; Victoria L. Mayer¹; Laurie Edelman¹; Jonathan Arend¹; Brett Ives³; Maria E. Rodriguez²; Carol Levy¹; Ronald Tamler¹; Carol R. Horowitz¹; Abby L. Schwartz²; Eva Waite¹; Theresa Soriano¹. ¹Icahn School of Medicine at Mount Sinai, New York, NY; ²Mount Sinai Diabetes and Cardiovascular Alliance, Mount Sinai Health Network, New York, NY; ³Boston University, Boston, MA. (Tracking ID #2197919)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Management of Type 2 Diabetes Mellitus (T2DM), a disease affecting over 29 million people in the United States, poses a significant challenge to health systems, resulting in the need to formulate highly effective primary care delivery models in order to improve diabetes-related outcomes.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To optimize management of patients with diabetes by improving Hemoglobin A1c (HbA1c), blood pressure, and weight, and to increase adherence to diabetes-related health maintenance guidelines, such as retinopathy, neuropathy, and nephropathy screening and pneumococcal vaccination. 2. To train resident physicians and other practitioners in the multidisciplinary, collaborative management of diabetes in order to expand knowledge and improve future care of patients with diabetes. 3. To utilize the expertise of various team members, including certified diabetes educators (CDEs), general internal medicine attendings, endocrinologists, nurses, residents, community health workers, and care coordinators to provide a scalable, generalizable experience where patients feel equipped and motivated to improve diabetes self-management.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Internal Medicine Associates is an urban academic internal medicine primary care practice with approximately 29 % of patients suffering from T2DM. We provide care to the diverse community of East Harlem, predominantly Latino and African American residents suffering the highest rates of diabetes and diabetes-related complications and mortality in New York City. In order to improve outcomes, we implemented a novel, multidisciplinary, team-based program which places the Registered Dietitian (RD)/CDE at the center of the care team. Patients with HbA1c $\geq 8\%$ can be referred to our program by their primary care providers, and care coordinators facilitate enrollment. Patients subsequently meet for individual sessions with a RD/CDE who provides nutritional counseling, assesses disease management and risk of complications, identifies barriers to adherence, delivers intensive self-management support, and refers to other team members as needed, such as depression care specialists and community health workers. A unique aspect of our program is that the RD/CDEs are fully integrated into our existing clinic practice, and consult with faculty physicians in real-time for medication management. We collaborate regularly with endocrinologists to review difficult cases and ensure our general internists and CDEs are qualified to deliver the most up-to-date care for T2DM. In an effort to engage resident physicians in diabetes management, first year internal medicine residents rotate through our program during their ambulatory blocks. Residents are provided with didactic sessions that improve knowledge of diabetes therapies, motivational interviewing techniques, and instruct how to promote patient self-management. These skills are then applied during diabetes-focused visits with patients referred to our program. Finally, care coordinators facilitate pre-visit planning and follow up, and use specially designed clinical decision supports and feedback of quality metrics enabled through our electronic health record to optimize care and communication with patients and other team members.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Using the electronic medical record, we are gathering demographics, comorbidity, and longitudinal data on diabetes-related biometric outcomes for participating patients before and after enrollment, including blood pressure, weight, HbA1c, LDL cholesterol, hospitalizations and ED visits, and adherence to quality metrics such as retinopathy, neuropathy, and nephropathy screenings. We will compare HbA1c trends among those enrolled in the program to other patients in the practice with similar glycemic control and demographics at the first time point.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): During the first 12 months of our program we saw 164 patients for two or more visits. The number of patients with HbA1c values $\leq 9\%$ increased from 29 to 50 % ($p \leq 0.005$ %). The number of patients with HbA1c values less than 8 % increased from 4 % at enrollment to 23 % ($p \leq 0.005$ %).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Utilizing the CDE in a team-based approach to diabetes management has been shown in the literature to improve outcomes while reducing cost; our findings to date further support this model. Our novel physician-extender program has been successful in improving glycemic control in a high-risk population utilizing physician extenders. Our program is integrated into the existing clinic workflow, engaging faculty physicians in diabetes co-management. We have found that it is feasible to involve residents and build an educational component around a multidisciplinary chronic care model. The strength of our model lies in the central role of the RD/CDE, the real-time collaboration with physicians, and robust care coordination. We believe this model is generalizable to other institutions and practice models, and can provide another dimension for chronic care management.

A PATIENT-CENTERED APPROACH TO ADDRESSING WOMEN'S HEALTH IN A REFUGEE POPULATION Jessica E. Murphy³; Chiamaka Onwuzurike¹; Aba Barden-Maja². ¹University of Pennsylvania, Philadelphia, PA; ²Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA; ³Hospital of the University of Pennsylvania, Philadelphia, PA. (Tracking ID #2190396)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Since 2010 our clinic has cared for refugees who have recently resettled in Philadelphia, and women's health was identified by both physicians and patients as an area in need of improvement.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): A refugee women's clinic was created in July 2013 with the objectives of (1) improving patient education about cervical cancer screening and contraception, (2) improving family planning counseling, and (3) screening for sexual violence.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Patients are seen in the women's clinic soon after their initial comprehensive refugee in-take exam. To create a comfortable environment, the clinic is staffed by only female providers and includes in-person female interpreters. Prior to being seen by the physician, patients participate in a group educational session led by medical students. These sessions address various women's health topics, including Pap smears and contraception, while providing patients with the opportunity to ask questions and learn from the experiences of other members of their community. Subsequently, the physician performs a comprehensive women's health assessment. All providers use a standardized template within the electronic medical record. Providers screen for gynecologic complaints and perform appropriate bone and breast health screening. Providers discuss family planning, specifically the patient's history of contraceptive use, their reproductive plan, and their current interest in contraception. Finally, providers screen for any history of physical or sexual violence and for symptoms of depression or PTSD. All patients of reproductive capability receive a pregnancy test, and if indicated, a Pap smear is performed. Patients who are prescribed a new method of contraception are referred to our contraception adherence program where they will follow-up with our clinical pharmacist at 1 month and 4 months, with the goals of ensuring proper use of each method, addressing any side effects, and reducing discontinuation rates.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Quantitative data from the visits will be analyzed, including the rates at which women of appropriate age are receiving Pap smears and contraceptive education, how well we are meeting the contraceptive needs of our patients, and how frequently we are uncovering positive sexual violence screens. In addition, patients will be surveyed regarding their experiences in the clinic to determine whether we have achieved our goal of establishing a comfortable and secure environment for such an intimate visit.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Since the initiation of our clinic through December 31, 2014, we have had 11 clinic sessions and seen 34 women at a total number of 37 clinic visits. Patient ages range from 19 to 37 years with a mean of 39.5 years. The top three nationalities represented have been Bhutanese (20.6 %), Burmese (29.4 %), and Iraqi (17.6 %). In terms of cervical cancer screening, 82.4 % of patients had never previously had a Pap smear, however after our educational sessions 76.5 % of patients said they were knowledgeable about Pap smears. Pap smears were performed on 25 of the 27 patients with an indication for testing. In terms of contraception care, 73.5 % of patients were premenopausal, and 64.7 % were currently sexually active. 64.7 % of patients had a history of birth control practices, with Depo-Provera and oral contraceptive pills equally most utilized and together making up 72.8 % of previously used methods. 44.1 % of patients were interested in birth control and all of these patients left the visit with a contraceptive plan, most commonly oral contraceptive pills. Overall, our unmet need for contraception has decreased from 29 % prior to beginning our women's clinic to 11 %, and 3 patients have enrolled in our contraception adherence program. In terms of safety and violence screening, we did uncover several patients who had been victims of violence, including 1 patient with a history of female genital cutting and 2 with a history of sexual assault, however all patients asked about safety at home reported feeling safe.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Refugees are a unique and challenging population. Their previous experiences are often traumatizing and can make this population particularly sensitive to vulnerable situations including invasive office exams and screening questions. Our model of a women's clinic that is staffed by women, involves group educational sessions, and includes a comprehensive history and exam with the assistance of in-person interpreters is a novel approach to address this problem. Other institutions attempting to provide culturally sensitive but comprehensive women's care may find this model helpful, particularly if caring for a vulnerable population.

A PHARMACIST BASED INTERVENTION TO PREVENT MEDICATION ERRORS AT DISCHARGE Navneet K. Sidhu¹; Christopher T. Bunn²; Tiffany Montoya³; Bart Cox¹. ¹University of New Mexico, Albuquerque, NM; ²University of New Mexico, Albuquerque, NM; ³University of New Mexico, Albuquerque, NM. (Tracking ID #2199419)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Medication errors at the time of hospital discharge are common and can lead to preventable adverse drug events (ADE's). Over 40 % of all medication errors are believed to result from inadequate reconciliation. Of these errors about 20 % result in patient harm. Hospitalized patients are subject to at least one medication error per day.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The goal of the project is to identify and correct medication errors before a patient is discharged from an inpatient cardiac unit. Types of error are tracked over time and educational interventions are created to target errors that occur frequently.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): After physicians complete discharge medication reconciliation, a pharmacist trained in cardiac and chronic disease state management evaluates the discharge medication list. If discrepancies are identified they are corrected before the patient is discharged. These interventions are categorized and tracked over time. Critical interventions are defined as those which are likely to lead to readmission or ADE's. Critical errors are defined as: duplicate, omitted, incorrect doses of medications, inappropriate medications, or missing dose, route, or frequency on the medication list. Non-critical interventions are those that are less likely to cause a readmission or ADE's. Changing medication therapy for cost savings, physician failing to sign the discharge documents in the electronic medical record (EMR), eliminating abbreviations from the patient medication list, assistance from a pharmacist for drug-drug/disease interaction, clarification of complex medications regimens, or other prescription assistance were defined as non-critical interventions.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Percentage of discharges intervened on by a pharmacist. Number of errors identified at discharge. Types of errors identified by the pharmacist. Categories of error as they change over time.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): From 10/2012-102014 a pharmacist intervened on 69 % of 2530 discharges that were reviewed. Over a ten month period in 2014, 1414 interventions on the discharge documents were identified and corrected by a pharmacist. Six hundred and thirty of these errors (44.6 %) were categorized as critical interventions. Categories and rates of critical errors were: omission of medications (33 %), missing dose, route, or frequency (22 %), inappropriate medications (20 %), incorrect dose of medication (16 %), and duplicate medication (8 %). Based on the initial information regarding types of errors, a medication reconciliation orientation was created for residents rotating through the cardiology service. The attached figure demonstrates the changes in the types of error that occurred following the educational intervention.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Using a pharmacist based intervention can identify and prevent critical medication errors at discharge. Omission of medications from the discharge list is an error that occurs at a high rate despite educational interventions. A special folder of medications organized by disease state is being created in the EMR for easy access to discharge prescriptions. The folder will contain prepopulated evidence based dose, route, frequency and indication of common medications. We will continue to track interventions and hypothesize that this will decrease omissions of medications and missing dose, route, frequency of medications from the discharge list. Categorizing and tracking errors over time can be used to create novel educational and technological innovations to reduce potential ADE's.

A QUALITY IMPROVEMENT PROJECT TO IMPROVE DIABETES CARE IN A TRAINEE CLINIC Anuradha Phadke²; Nazima Allaudeen¹; Nicole Grant¹; Steven Asch¹. ¹Palo Alto VA Healthcare System, Palo Alto, CA; ²Stanford University School of Medicine, Palo Alto, CA. (Tracking ID #2194859)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Teaching chronic disease management to internal medicine residents is challenging—while individual case presentations are at the core of clinical teaching, sharing registry data with residents teaches them crucial population based management skills.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The goals of our intervention were 1) to increase the rate of residents reporting exposure to diabetes practice patterns and 2) to decrease the rate of diabetic patients in our clinic with suboptimal blood pressure control and missing diabetes labs.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The project took place in a Veterans Affairs hospital general internal medicine teaching clinic with 493 diabetic patients. Baseline rates of adherence to diabetes quality metrics were suboptimal. Thirty-five percent of patients had a most recent blood pressure greater than 140/90. Eighteen percent of patients did not have an annual hemoglobin A1c on record and 25 % did not have an annual urine microalbumin. In the last Accreditation Council for Graduate Medical Education (ACGME) survey, 44 % of affiliated residency program residents reported that data had not been provided to them regarding their clinical practice patterns. We conducted chart review of a convenience sample of patients to determine the principle root causes for missing labs and suboptimal blood pressure control. 10/29 (35 %) patients who lacked annual hemoglobin A1c had not scheduled or had missed recommended follow-up appointments and 5/29 (17 %) patients had not had ordered labs drawn. 6/27 (22 %) patients had high blood pressure documented at a non-primary care, medical specialty clinic visit and 5/27 (19 %) patients with elevated blood pressure had not followed up in clinic as recommended. We presented these results to clinic leadership to devise a population management and process improvement based solution. We conducted numerous plan-do-study-act (PDSA) cycles testing generated change ideas. Ultimately, we devised an intervention that coupled quarterly trainee-directed audit and feedback about diabetes care performance with academic detailing regarding team-based registry management and institutional diabetes management resources. As an adjunct, we implemented a process improvement and checklist intervention to encourage pre-clinic lab ordering and patient reminder phone calls. In combination, these interventions targeted the main root causes and our educational gap. As our clinic was already divided into distinct sides, we devised a quasi-experimental intervention, where residents on one side of the clinic participated in the intervention and the other side served as a comparison group.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The process and educational measures are the percent of residents who participate in this intervention, initiate a plan of care, and report receiving clinical performance data during their annual program survey. The clinical outcome measures are the percent of registry patients missing annual hemoglobin A1c, missing annual microalbumin, and with blood pressure greater than 140/90. We will compare the rates between control and intervention groups adjusting for clustering by provider.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The checklist intervention was started 2 months ago with all but a few residents having participated. The audit, feedback, and academic detailing intervention began approximately 1 month ago and 14 of 22 intervention-group residents have participated with qualitative data reporting good acceptance of the intervention. At present, rates of missing hemoglobin A1c on the intervention side have decreased to from 18.1 to 16.9 % with rates on the comparison side increasing from 17.3 to 20.0 %. No change has been noted in blood pressure or rates of missing microalbumin, but we anticipate changes may lag interventions by months. Clinical measures will be collected every 2 weeks for the remainder of the academic year.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Limited clinic attendance and lack of familiarity with established clinic processes prevent residents from optimally managing the chronic diseases of their patients outside of clinic encounters. Using a combination of modalities - (1) audit and feedback with peer comparison (2) academic detailing regarding team-based registry management and diabetes care resources (3) and implementation of a lab preordering reminder checklist- we have started to bridge this gap. Through our PDSA cycles, we have learned that trainees prefer performance data to be pushed to them rather than pulling data from a registry and that data is less overwhelming to trainees if curated and presented with specific improvement suggestions regarding performance gaps. Feedback regarding improving performance should also emphasize the importance of using a team-based approach and leveraging existing methods of communication used in clinic.

A QUALITY IMPROVEMENT PROJECT: OPTIMIZING INPATIENT DISCHARGE FLOW Erin Lundberg¹; Meghan M. Lyman³; Anne Tomolo^{1, 2}. ¹Emory University School of Medicine, Atlanta, GA; ²Atlanta VA Medical Center, Atlanta, GA; ³Centers for Disease Control and Prevention, Atlanta, GA. (Tracking ID #2196154)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Peaks in hospital discharges throughout the day impact the availability of resources, including inpatient beds, contributing to increased ED boarding time.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To evaluate discharge smoothing by determining the percent of

patients discharged from medicine teams before noon from a baseline period through multiple Plan-Do-Study-Act (PDSA) cycles of change. 2. To determine the impact of the quality improvement interventions on inpatient length of stay and Emergency Department (ED) boarding time

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The Atlanta Veterans Affairs Medical Center (AVAMC) is a tertiary care facility that has 273 inpatient beds. From June through October 2013, the peak discharge time at AVAMC was 2–3 pm and the percent of ED patients waiting for a hospital bed more than 4 h from the decision to admit time was 20.8 % compared to 7.2 % in VA nationally. Studies suggest that prolonged ED boarding time increases hospital length of stay and costs, increases mortality, and decreases patient satisfaction. ED boarding time depends on bed availability, which is affected by the flow of hospital admissions and discharges. To smooth the timing of inpatient discharges throughout the day and improve availability of resources, a continuous quality improvement project was started in November 2013. The aim was to increase the percent of inpatients discharged before noon from a baseline of 13.8 % (June through October 2013) to 30 %. The first three PDSA cycles of change focused upon engaging inpatient nurse practitioners (NP), educating medical residents about early discharge planning and related tools, and using team-based report cards that included the percent of patients discharged before noon and use of discharge planning tools. In April 2014, a fourth cycle of change was instituted to enhance communication about discharges. The intervention was a brief interdisciplinary huddle and included representatives from inpatient teams (physicians and NPs), utilization management, bed control, radiology, cardiology, physical therapy, home health, and transportation. Team representatives presented information about patients ready for discharge in an effort to resolve impediments to discharge and expedite pending tests and evaluations necessary for patients to be discharged home later that day and the following day.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The percent of medicine patients discharged before noon was measured weekly and graphed on a Statistical Process Control (SPC) P-chart. Data was collected from May 2013 through November 2014, including a 20 week baseline (June–October 2013). Balancing measures, such as hospital length of stay and ED boarding time, were evaluated from February through November 2014 in a run chart.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The 20 week period following the initiation of the report cards and the huddle (February–May 2014) represents special cause variation on the P-chart as indicated by data points above the upper control limit. These points show a larger variation than one expects to occur randomly, suggesting that the interventions did have an impact on the mean percent of discharges before noon, increasing from 13.8 to 22.4 %. The manual data collection required for the report cards was too time-consuming and the process was discontinued by June 2014. The previous improvements were not sustained by the huddle alone, and special cause was again noted. The P-chart showed two out of three successive values more than two standard deviations below the centerline (a line indicating the mean percent discharged before noon). This 24 week period (June–November 2014) following discontinuation of the report cards represents a new stable process with a mean of 14.2 % (pre-intervention period level). There was no special cause variation identified in the run charts of hospital length of stay and ED boarding time from February to November 2014.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): This study emphasizes the importance of monitoring performance measures in real time to inform quality improvement projects and the role of SPC in examining time series design. Timely and accessible performance data delivered to stakeholders, such as inpatient teams, resulted in significant improvement in discharge smoothing, which was not maintained with the implementation of the huddle alone. The most recent cycle of change is the development of an automated report of team-based inpatient flow metrics to facilitate the timely audit and feedback of data to the inpatient teams.

A SHORT MINDFULNESS-BASED INTERVENTION DECREASES PERCEIVED STRESS AND MEDICAL VISITS Lisa M. Grant. University of Wisconsin-Madison, Madison, WI. (Tracking ID #2191976)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Adults are not receiving the help they need to manage the stress in their lives.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Provide patients with tools to mobilize their own internal resources to optimize health and wellbeing. 2. Decrease patients' perceived stress. 3. Decrease healthcare utilization, (number of medical visits)

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Chronic stress can result in serious health problems. We hypothesized that a 5 week "Mindful Movement for Stress Management" Program, (MMSM), could decrease patients' perceived stress and decrease their number of medical visits. Subjects were patients in a university-based primary care clinic. "High-utilizer" patients were defined as those having four or more medical visits within a six month period. One thousand three hundred such patients were invited to attend a MMSM class. The first 28 patients to respond were enrolled. The program is modeled after the Mindfulness-Based Stress Reduction Program, (MBSR), developed by Dr. Jon Kabat-Zinn. It is an abbreviated version with the addition of an educational component about how stress commonly manifests in the body. The class met for one hour on 5 consecutive weeks. The objectives were for patients to better recognize stress when actually experiencing it, and to build resilience through the cultivation of an awareness practice. Each class included a didactic component about the anatomic and physiologic aspects of the stress response and an experiential component, focusing on the progressive acquisition of mindful awareness. Participants were given daily reading and homework assignments.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Participants self-administered the Perceived Stress Scale, (PSS), prior to the start of the classes, at the conclusion of the fifth class, and again 6 months after completion of the program. The PSS is a validated short questionnaire. It is the most widely used psychological instrument for measuring peoples' perception of stress and whether situations are predictable and controllable, or overwhelm the respondent. A lower score on the PSS represents lower perceived stress. Healthcare utilization was determined by the number of medical visits in the electronic health record for the 6 months prior to the class and the 6 months after. Medical visits were defined as outpatient visits with a physician or NP/PA. ER visits and procedures were excluded. Changes in PSS scores and medical visits were analyzed using paired t-tests.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Twenty-five patients completed the program. One person never attended and two subjects discontinued after the first class. All 25 completers reported that the class objectives were met and that this specific intervention provided them with concrete tools to help manage their stress and to find their own capacity for ease. The mean baseline PSS score was 23.1 out of a maximum of 40 points. The mean PSS score upon conclusion of the class was 19.4 with a mean difference of -3.7 . ($p=.010$). Nineteen subjects completed the 6 month PSS, with a mean PSS score of 15.4. This represents a 7.4 mean decrease for subjects who completed the survey. ($p<.001$). The mean number of medical visits in the 6 months prior to the class was 5.8. This decreased to a mean of 4.7 at six month follow up. This is a mean decrease of 1.2 visits. ($p=.077$). A subgroup analysis via paired t-test also looked at those patients who had six or more visits prior to the class, ($n=12$). This group showed a mean decrease of 2.7 visits, ($p=.016$). Larger, randomized controlled studies comparing this limited intervention to usual care are warranted.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A relatively brief MMSM program was feasible in a primary care setting. The program showed a significant sustained improvement in patients' perceived stress and also decreased clinic visits in the highest healthcare utilizers. The program is a time-limited, low-cost intervention, intended to provide relief of suffering; empowering patients while aiming to also lower costs for the system that cares for them. Chronic stress brings numerous symptomatic complaints and is also a driver of chronic disease and healthcare utilization. Stress reduction could thus lead to improved chronic care outcomes and decreased healthcare costs. The electronic health record can readily identify those patients that are the highest utilizers of the healthcare system. These patients may have the most to gain by learning the self-care strategies explored in MMSM programs. While this particular program was taught by a physician, it may be more cost-effective to have another member of the healthcare team lead the class. Experience in leading mindfulness groups can often be found in psychologists, social workers, and yoga teachers. A PA/NP could also combine their medical expertise with a different professional providing the mindfulness piece. Further consideration could be given to offering stress reduction techniques as a group medical visit.

A SUCCESSFUL INTER-PROFESSIONAL TRANSITIONAL CARE MANAGEMENT (TCM) IMPROVEMENT STRATEGY AT AN ACADEMIC PCMH Kathy Salter²; Beverly Barrineau²; Christine Wheeler²; Sherry Doniphan-Davies²; Sarah Ball²; Elisha L. Brownfield¹; Kimberly S. Davis². ¹MUSC, Charleston, SC; ²Medical University of South Carolina, Charleston, SC. (Tracking ID #2198778)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): To successfully deliver a high rate of TCM services, clinics need a relatively complex clinical and

support strategy including rapid follow-up contact by staff, increased clinic access for hospitalized patients, and coordination within the PCMH team including clinical staff, scheduling, clinic registration, pharmacists and physicians.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Transitional Care Management (TCM) service is a new Medicare payment policy instituted in an effort to improve care coordination and reduce hospital re-admissions. TCM requires a systematic clinical and support strategy to maximize impact. TCM billing requirements include patient contact by a staff member from the practice within 2 business days of hospital discharge, and a primary care clinic visit within 7 or 14 days. If the patient is readmitted within 30 days, a TCM service will not be paid. The goal of the PCMH team was to maximize TCM service delivery to improve care coordination and reduce risk of hospitalization.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): University Internal Medicine (UIM) developed a multi-step process to implement and refine our TCM management strategy using a data-driven quality improvement strategy. After an automated electronic notification of the patient discharge (limited to University Hospital only), the nurse case manager (CM) uses a scripted telephone follow-up tool focused on assessing clinical stability, medication reconciliation, and scheduling an appropriate physician follow-up appointment within the time interval. If a patient is uncertain about the medication regimen, the CM can consult a pharmacist of physician for clarification. Once the phone contact has been completed, the CM generates a paper 'TCM notice' that is attached to patient intake packet at registration pending the day of the visit. This 'TCM notice' serves to remind the physician/provider that the patient visit is for a Transitional Care Management, the appropriate patient contact had been completed, the patient is eligible for TCM service and includes the visit codes for TCM billing. If the patient does not complete the first scheduled visit, the notice serves as a trigger for the CM to follow-up with the patient and to reschedule the patient with provider. Using rapid cycle improvement process, we tracked rates of completion of each step of the process in the TCM service and calculated the monthly completion rates of TCMs over time.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): With total monthly hospitalizations as the denominator, the PCMH team calculated monthly rates of successful patient contact by a CM within 2 business days of hospital discharge, contacts outside the 2 day window, completed clinic visits within 7 days, 8 to 14 days, and successful TCM coded and billed visits within 7 and 8–14 days. Data source for CM phone contacts was the electronic record (Epic) and for TCM service code was the practice billing data.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): UIM is a faculty and internal medicine practice serving a population of 12,000 patients with a mean age of 57 years (SD 16.6), 37 % male, 47 % African-American, and provides over 30,000 annual visits. The population averages about 200 hospital admissions per month at University Hospital. Over the 12 months of the study, the PCMH team increased the rate of nurse follow-up phone calls from approximately 50 to 75 % and the rate of completed TCM-coded visits from 18 to 25 %.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): TCM services require rapid follow-up contact by the PCMH team improved clinic access for hospitalized patients, as well as coordination between CM, scheduling, clinic registration, pharmacists and physicians. The most common reason for not completing the phone calls after discharge was CM staff availability and the most common reason for failure to complete TCM physician visits was patient nursing home or rehabilitation placement. In response to the high rate of post-hospital placement, CMs now set a 20 day reminder to re-contact patients and schedule TCM services at discharge from that facility. We are assessing impact on admission and readmission rates.

A TEAM APPROACH TO IMPROVE CONTROL OF HYPERTENSIVE PATIENTS IN A HOSPITAL BASED AMBULATORY CARE PRACTICE

Lisa Rucker¹, Eleanor Weinstein², Katalin Macs¹. ¹Albert Einstein College of Medicine/Jacobi Medical Center, Bronx, NY; ²Jacobi Medical Center, Bronx, NY. (Tracking ID #2184956)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Management of chronic diseases like hypertension require a team approach, outreach and adequate access to care.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To utilize a team approach engaging all levels of staff to improve performance. 2. To utilize population management strategies and a chronic disease registry to track progress and trends and outreach to patients who need care. 3. To improve hypertension control to >60 %.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

HHC (Health and Hospitals Corporation), a large public hospital system and the safety net provider for NYC, developed a registry to track control of patients with hypertension. At Jacobi Medical Center, a teaching hospital in the Bronx, about 37 % of hypertensive patients were controlled in 2012. An HHC, team-based PI initiative set >60 % control of hypertension as the goal. Team members include primary providers, RNs, patient care associates, population managers, dietitians, pharmacists, call center staff, social workers, and practice administrators. The following are examples of interventions implemented as part of the program. 1. Housstaff a. Group Visits- A faculty physician, 2 residents, dietitian, pharmacist and nurse lead these ½ day sessions. Twelve patients with uncontrolled hypertension are scheduled. The didactic content is patient driven and each patient is also seen individually. b. Planned visits- Each resident has one session during his/her outpatient block to schedule two patients with uncontrolled hypertension for extended time to teach, counsel, and explore issues of non-adherence. These visits also include time with the RN or social worker depending on the barriers to control. c. Peer Review- Resident physicians participated in a chart review of patients with uncontrolled hypertension to assess for systems, process or provider issues as barriers to control. 2. Patient Care Associate (PCA) and RNs a. PCAs were re-educated on the proper technique for measuring BP and observed to assure competency. b. Treat-to-Target Program - RNs see uncontrolled, complex hypertensive patients referred by their providers. The RNs assess and counsel patients and adjust medications according to pre-written orders using motivational interviewing techniques. They also distribute sphygmomanometers for home monitoring. c. Team RNs see less complex uncontrolled hypertensive patients referred by their providers for a BP check after medication adjustment—generally within 2 weeks of the initial appointment. 3. Practice Administrators a HTN Task Force- An administrative group of team leaders meets weekly to discuss all aspects of the hypertensive challenge, following trends and tracking progress. b. Access- By the guidelines of the registry, patients who had not had a BP checked in the previous 6 months, were “uncontrolled.” About 1/3 of our registry had not been seen in > 6 months. Given our persisting issues with access, we created “HTN sessions” for all providers to create appointment availability for these patients. c. Call center -The call center contacts “uncontrolled” patients from the registry to schedule appointments. This is the first experience with targeted outreach for the practice. 4. Faculty Providers and NPs. a. Performance Feedback- Providers are given their registry data relative to other providers so they can track their own progress. b. Focus on hypertension—While precepting learners in the practice, the faculty reinforces tighter BP control and timely changes in therapy and f/u for the uncontrolled.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We measured the number and percentage of patients whose hypertension was controlled.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Of the 4080 hypertensives, we have achieved target BP according to HHC guidelines in 64.3 %. Were we to follow the less-stringent recent guidelines with BP target <150/90 in patients aged 60 or older, the yield would be even higher. Chronologically, the last two interventions we instituted—increasing the number of available appointments with primary providers and with the team nurses—had the biggest impact, raising the percent controlled from 42 to 64.3 %. (Figure 1 shows timeline of intervention and % effect). However, success comes at a cost. In a system that is chronically oversubscribed, the waits for appointments for non-hypertensive patients escalated.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Key Lessons for Dissemination—The use of a patient registry is instrumental to track patients, chronic disease indicators and performance. Population management with targeted outreach is key to success when access to care is limited. Nurses play a vital role in collaboration as they educate, motivate and follow the patient to their goal BP. Chronic disease management strategies using planned visits, group visits and all members of the health care team (pharmacists, dietitians, PCA's) result in improvements in outcomes.

AN INTEGRATED TAI CHI INTERVENTION FOR FALL PREVENTION AND WELLNESS PROMOTION AMONG ELDERLY PATIENTS AT BOWDOIN STREET HEALTH CENTER

Hsiang-Wen Wang¹, Connie R. Shi², Gordon Keir³. ¹Harvard School of Public Health, Brookline, MA; ²Harvard Medical School, Boston, MA; ³Harvard Business School, Boston, MA. (Tracking ID #2194140)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Falls are a major source of morbidity and mortality among adults aged 65 and older; here we describe the design and implementation of a novel holistic fall prevention intervention incorporating regular Tai Chi exercise and fall risk education for a cohort of elderly patients at Bowdoin Street Health Center (BSHC).

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) Falls Prevention: Reduce risk of falling among elderly patients at BSHC, measured by improved balance and mobility, reduced number of falls, reduction in participants' fear of falling. 2) Patient Education: Educate patients on fall risk factors via discussion sessions led by clinical staff and promote health literacy in a socioeconomically challenged patient population facing multiple co-morbidities. 3) Patient Engagement: Create a community focused around health education, motivating elderly patients to improve their health through regular group exercise.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Our intervention is a 6-month, multi-component program featuring 1) twice weekly Tai Chi instruction led by an experienced Tai Chi instructor, and 2) a longitudinal, comprehensive fall prevention curriculum led by BSHC clinical staff covering a variety of fall risk topics such as home safety, stretching and flexibility, and nutrition. The program provides an environment for health engagement for a population of elderly patients challenged by multiple chronic co-morbidities, isolation, social inequality, low health literacy, and lack of access to wellness resources. We collaborated with Bowdoin Street Health Center (BSHC), a community health center and NCQA Level 3 Patient Centered Medical Home located in Dorchester, MA. Seventeen percent of patients at BSHC (1253 individuals) are aged 65 and older. BSHC primary care providers referred their patients aged 65 and older to the program if the patients had a history of falls or multiple fall risk factors. Program participation was voluntary, with recruitment conducted by phone call and mailings. Transportation assistance for participants was provided as necessary. The program was implemented with support of the Harvard Medical School Center for Primary Agents of Change Challenge Grant.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Qualitative metrics collected include patient surveys assessing fear of falling, functional status (activities of daily living), and knowledge of fall risk. We conducted focus groups to elicit feedback about program structure, progress, and perceived effects / benefits. Quantitative metrics collected include two validated clinical assessments of fall risk. The Timed Up and Go test, which measures the time it takes to walk 20 ft, and the Tinetti Balance & Gait Assessment, which evaluates ability to safely perform a variety of tasks including walking, turning, and maintaining balance, were performed pre- and post-intervention. We will assess actual falls using chart reviews and participant self-report.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Nineteen patients have participated in the program, of whom 58 % (11) are female and 42 % (8) male. The participants' average age is 73 years. Average attendance per class is 12. The program is still in progress until late Jan 2015. Based upon initial and midpoint balance and gait assessments, we have found the following: Pre-Intervention (Aug. 2014), $n=12$ Avg. Timed Up and Go: 13.5 s (range 8.4–27 s) Avg. Tinetti Balance score: 11.8 (out of 14); Avg. Tinetti Gait score: 10.25 (out of 12). Program Midpoint (Nov. 2014), $n=10$ Avg. Timed Up and Go: 12.67 s (range 10.3–16.7 s) Avg. Tinetti Balance score: 13.3 (out of 14); Avg. Tinetti Gait score 11.7 (out of 12). A lower Timed Up and Go time indicates participants are able to more quickly complete a walk of 20 ft. Higher Tinetti Balance and Gait scores indicate participants are able to better complete a variety of balance and mobility tasks. These results suggest that even after only 3 months of twice weekly Tai Chi practice, program participants experienced objective improvements in mobility and gait. Participants reported improvements in back, shoulder, and knee pain. Other qualitative improvements in mobility and strength include no longer needing to use walking sticks and assistive devices, and greater ease in walking up and down stairs.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): By combining regular group exercise with comprehensive patient education led by clinical experts, this intervention has targeted the multifocal risk factors associated with falling. Participants report the importance of social group interaction and the positive benefits of working to reduce fall risk in a supportive community of peers and instructors. Consistently high attendance, positive participant feedback, and objective improvements in participant balance and mobility after only 3 months demonstrate that a robustly designed longitudinal and multi-component fall prevention intervention can successfully engage socioeconomically disadvantaged elderly patients in the community health center setting.

ATTRIBUTES OF AN OUTPATIENT GERIATRICS CONSULT SERVICE IN THE SAFETY NET Anna H. Chodos^{1, 4}, Janet Myers², Alain Takane⁵, Edgar Pierluissi⁶, Christine Ritchie³. ¹UCSF, San Francisco, CA; ²University of California, San Francisco, CA; ³University of California San Francisco, San Francisco, CA; ⁴Division of Gen Int Medicine, SFGH, San Francisco, CA; ⁵Univ of Hawaii, Honolulu, HI; ⁶UCSF, SFGH, San Francisco, CA. (Tracking ID #2199466)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In safety net primary care, there are rarely adequate geriatrics specialists to address assessment and management needs for older adults with geriatrics issues.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Implement a geriatrics consult service to: 1) Provide a spectrum of consultative services for older patients referred by primary care providers (PCPs) including electronic consults (e-consults), care coordination services and comprehensive evaluations in an in-person consultation clinic. 2) Perform a chart review to understand the service's patient population, consult activities, PCP satisfaction, and impact on patient's medication use.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The outpatient geriatrics consult service is delivered in an urban safety net health care system: San Francisco General Hospital's primary care clinics. The SFGH system uses a web-based platform, called eReferral, that interfaces with the electronic health record and allows primary care providers to submit referrals to specialty services. Through eReferral, specialists can then submit responses with clinical management suggestions or request further work-up and can schedule patients into their clinics. During the pilot phase, two geriatricians spent four hours per week reviewing consults submitted via eReferral and provided various levels of service based on the clinical scenario: an e-consult reply only, and e-consult reply and some care coordination (e.g. ordering physical therapy, discussing with patient's social worker and creating a care plan), or seeing the patient in-person for comprehensive geriatrics assessment in a monthly 4-h clinic. A pharmacist was available later in the pilot to staff the clinic. The pilot clinic served two large primary care clinics, an adult internal medicine clinic and a family practice clinic. Both clinics are training sites for residents.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): To understand how this service could be most effectively targeted and expanded, we performed chart review on the pilot period from October 2012 to November 2013 to characterize the patient population served and the nature of the service's consult activities. We recorded 1) patient characteristics, medical conditions, and changes in their medication use; and 2) consult triage outcomes (e-consult, etc.), questions submitted by PCPs and geriatricians' recommendations. We measured provider satisfaction with surveys. We compared pre and post-consult number of medications using paired t-tests.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Primary care providers consulted the service on a diverse patient population. Sixty-nine providers referred 101 patients, 5 were under 65 and excluded from the chart review. Of the remaining 96, the mean age was 78.5 years (± 6.9 , range 65–95); 63.5 % were women; 12 % were white, 13 % black, 44 % hispanic, and 31 % asian. The majority were foreign born (73 %), poor (84 %), and lived with family (58 %). The mean number of chronic conditions was 5.4 (± 2.2). Consult service activities were varied: 17 % received e-consult, 21 % received e-consult and care coordination activities, and 63 % received comprehensive assessment. Providers often submitted more than one question per consult, with a median of 3. The most common were: cognitive evaluation (64 %), medications (38 %), comprehensive evaluation (38 %), falls (31 %), and social service needs (26 %). Median number of recommendations was 10, which was the max recorded in our chart review (mean 7.2). The most common related to: medications (87 %), cognitive evaluation (80 %), falls (58 %), social service needs (56 %), and goals of care (55 %), which were all higher than the prevalence of these conditions in consult questions. Most users reported being satisfied: 94 % agreed or strongly agreed that the consult "addressed their concern to a satisfactory level". Six months post-consult mean number of medications decreased (9.5 to 8.8, $p=0.056$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A Geriatrics Consult Service with a small geriatrics staff served safety net providers seeing complex, vulnerable older adults. Overall, 38 % of consults did not require an in-person consultation by a specialist to adequately address the PCPs question, suggesting there is potential for a small geriatrics staff to help many PCPs with clinical geriatrics questions. The consults detected unaddressed clinical geriatrics issues, particularly cognitive impairment and medications, suggesting there is an on-going need for geriatrics services. Further evaluation of its impact are needed and on-going monitoring of its activities will help inform its clinical utility as it expands to more primary care clinics.

BRIDGE-TO-CARE: IMPLEMENTING A QUALITY IMPROVEMENT INITIATIVE TO TRANSITION PATIENTS TO A PERMANENT PRIMARY CARE PROVIDER (PCP) THROUGH INTERPROFESSIONAL COLLABORATION IN THE CRIMSON CARE COLLABORATIVE-INTERNAL MEDICINE ASSOCIATES (CCC-IMA) CLINIC (2012–2015) Jolene M. Singh; Julia Pian; Xiaoli Mi; Barbara A. Quaraglia; Meaghan O. Cloutier; Thalia M. Krakower. Massachusetts General Hospital/Harvard Medical School, Boston, MA. (Tracking ID #2200904)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): The CCC-IMA practice started as a student-faculty collaborative clinic in 2010 with a dual aim—to provide top-notch care and to transition patients to a permanent PCP within 1 year of receiving services in our clinic, but an evaluation of the bridging rate at the end of 2011 showed that a significant proportion of patients were “lost-to-follow-up.”

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Assess the needs of the clinic and resolve cases lost-to-follow-up through convening a Bridge-to-Care (BTC) Task Force 2. Construct and implement an algorithm for bridging patients within 1 year of starting to receive services in the clinic 3. Promote higher rate of bridging within the 1 year term and lower rate of loss-to-follow-up by performing audits at regular intervals to monitor and improve the bridging process

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The CCC-IMA clinic is a student-faculty collaborative which serves two types of patients: those requiring urgent care in an evening clinic and those who do not have a PCP. The clinic also aims to bridge patients who have not established a PCP to a permanent PCP within one year. However, during the 2010–2011 period, there were many patients who had been “lost-to-follow-up” and whose bridging status was unknown. As a result, there was a need for a) follow-up in these cases (called “the olds”) and b) institution of a system to avoid losing track of current/future patients. The BTC Task Force included Resource Center (RC) volunteers, medical/nurse practitioner (NP) students, full-time clinic staff and the physician director of the clinic. The task force met approximately monthly to assess the needs of the clinic and to brainstorm mechanisms for following up with the patients whose status was unresolved after being seen in the clinic for more than one year, as well as, to construct an algorithm for bridging patients in the future. Call scripts and guidelines were devised for following up with “the olds” patients and a new algorithm was put in place for following up with current/new patients in the clinic. To bridge patients within one year, we found it beneficial to have RC volunteers explain the bridging program to patients at their first clinic visit. Medical/NP students, full-time clinic staff and physicians would work with the RC to ensure that all BTC patients interacted with RC volunteers and the option to bridge to Internal Medicine Associates (IMA) primary care residents was made available. Finally, an auditing procedure was implemented to ensure compliance and to provide regular follow-up phone calls and letters to patients who would likely be lost-to-follow-up due to missed appointments, etc. The audit tracking system reports can be cross-validated by electronic medical record (EMR) tracking because we place a Crimson Care Collaborative (CCC) logo/tag in the EMR of patients whose bridging status has not been resolved.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The BTC Task Force introduced an algorithm and scripts for following up with “the olds” patients. As a result the bridging status of all patients seen between 2010 and 2011 was tracked through follow-up at clinic visits, by phone and/or by mail. Every current/new patient is tracked in two ways—(1) a CCC tag is attached to the EMR until the patient has successfully bridged to PCP or declines the bridging service and (2) the patients are tracked in a spreadsheet shared with clinic staff where bridging interactions are logged. Quantitative measurements such as time to bridging and bridging rates within 1 year of the first clinic visit are being recorded and monitored in the tracking system.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The BTC Task Force constructed and implemented an algorithm for reaching patients whose bridging status had been unresolved for one year or more. As a result, the status of 2/3rds of “the olds” patients was resolved and the remaining 1/3rd were marked lost-to-follow-up after three phone calls and one letter were sent over the span of at least six weeks. An algorithm was implemented for placing patients with PCPs within one year and many current/new patients have been matched to PCPs within the one year timeline. Several patients elect to bridge to residents in the IMA clinic. Patients decline bridging due to out-of-state moves, nursing home placement, and lack of insurance coverage. Interprofessional teamwork helps provide coverage outside of evening clinic hours, improving patient tracking.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The BTC Task Force was successful in its aim to resolve the status of “the olds” patients. In addition, its recommendations improved the clinic’s compliance with its goal of bridging patients to a permanent PCP within one year. Many patients have bridged to IMA residents. Regular audits, interprofessional teamwork, and increased communication between clinical and nonclinical professionals and volunteers about the bridging status of patients has improved the quality of our service, which can be quantified by decreased time to bridging, increased rate of bridging and decreased rate of loss-to-follow-up.

BRIDGING SILOS: SAN FRANCISCO GENERAL HOSPITAL’S CARE TRANSITIONS TASKFORCE Karishma Oza¹; Larissa Thomas¹; Elizabeth Davis^{1, 3}; Anna Robert^{2, 3}; Jeanette Cavano²; David Smith²; Jack Chase¹; Michelle Schneidermann¹. ¹University of California, San Francisco, San Francisco, CA; ²San Francisco Department of Public Health, San Francisco, CA; ³San Francisco Health Network, San Francisco, CA. (Tracking ID #2196065)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Complex medical and psycho-social conditions and limited resources create challenges in the transition from hospital to community for patients at San Francisco General Hospital (SFGH) and within the San Francisco Health Network (SFHN).

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): In 2012, the SFGH Care Transitions Taskforce was chartered to create a comprehensive, systems-based care transitions program that would provide patients with the proper care and tools they need to stay out of the hospital. The Taskforce grew through grassroots relationship-building into an organized, multidisciplinary working group comprising of inpatient and outpatient providers. Our collective goal is to reduce readmissions by 15 % and standardize and improve processes of care.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The SFHN has a commitment to serving San Francisco’s most vulnerable populations and encompasses a wide array of services across a continuum of care, including: primary care, specialty care, acute care, home care, long-term care, and emergency care. SFGH, the only public safety net hospital in San Francisco, plays an essential role as the primary acute care hospital in the system, providing 20 % of the city’s inpatient care. Its patient population is diverse and particularly at risk for readmission. On average, 8–10 % of admitted patients are marginally housed or homeless. Approximately 30 % of patients are uninsured, 40 % Medicaid and 20 % Medicare beneficiaries (FY 12–13). During this time period, the all-cause, 30-day readmission rate to SFGH was 13.5 %. Among higher risk patients such as those with heart failure, the readmission rate was 27 %. Since the Taskforce’s creation, we have successfully developed a multidisciplinary team including inpatient and outpatient physicians, nurses, pharmacists, social workers, utilization managers, and members of community-based organizations. The group meets biweekly to review data dashboards, discuss readmission cases, and present results of pilot projects to plan for dissemination. Some of the projects initiated through the Taskforce’s efforts include standardization of electronic discharge documents, creation of a data dashboard and network-wide discharge worklist, development of a process to improve linkage to post-discharge follow-up care, post-discharge pharmacist medication reconciliation visits, and enhancement of communication between inpatient and outpatient providers. Ongoing innovations promoted by Taskforce members include a hospital-based nursing program similar to Project RED (the Transitional Care Nursing program), a post-discharge follow-up clinic, and several new types of post-discharge visits in the medical home: health worker phone visits and clinic-based pharmacist and nurse visits.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The Taskforce has increased the proportion of patients attending post-discharge follow-up appointments, reduced duplication of services, allowed for more effective communication between providers, and streamlined access to medical information. Our wide reach has allowed for more rapid expansion of pilot projects with stakeholder input.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): As a result of Taskforce initiatives, the proportion of patients attending a follow-up appointment within 7 days of discharge has increased from 34 to 42 %; the 30-day readmission rate among patients attending appointments is 5 %. Although we have not yet achieved our targeted reduction in overall 30-day readmission rate, among patients over 55 years old with CHF, COPD, MI or pneumonia seen by the Transitional Care Nursing program, the average 30-day readmission rate has fallen from 18 to 11 %.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A multidisciplinary, cross-continuum working group is essential to successfully improving care transitions while avoiding duplication. The SFGH Care Transitions Taskforce has developed a model for strategically building a collaborative working group of key stakeholders that can innovate, disseminate care transitions improvements, and optimize efficiency and quality. The Taskforce’s strategy has led to targeted programs that have improved processes of care and reduced readmissions among a subset of high risk patients. Our challenges in achieving our target reduction in overall readmission rate speak to the complexity of the hospital-to-home transition and highlight opportunities to further target interventions that are tailored to each aspect of the transition.

BUPRENORPHINE GROUP MEDICAL VISITS: TEAM-BASED OPIOID ADDICTION TREATMENT IN PRIMARY CARE Aaron D. Fox^{1, 2}, Mariya Masyukova². ¹Montefiore Medical Center, Bronx, NY; ²Albert Einstein College of Medicine, Bronx, NY. (Tracking ID #2193235)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Opioid addiction is increasingly treated in primary care, but health system fragmentation has prevented collaboration between medical and behavioral specialists who treat addictions.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To develop a team-based opioid addiction treatment intervention for primary care by applying the model of group medical visits to buprenorphine maintenance treatment (BMT). 2. To implement the intervention in a federally qualified health center (FQHC).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Based on the model of group medical visits, we developed and implemented a multi-disciplinary intervention (group BMT) combining BMT, group counseling, and peer support. The setting was an academic health center-affiliated FQHC in a neighborhood deeply impacted by opioid addiction in the Bronx, NY. Before implementation, 10 general internists (PCPs) routinely provided BMT during primary care visits without collaboration with behavioral specialists. Development of group BMT involved literature review, observation of group medical visits for other conditions (e.g. diabetes), meeting with key stake holders, patient focus groups, design of materials, and formal request for administrative approval. The team included a general internist, clinical social worker, and a fourth year medical student who conducted group BMT, and a receptionist and nurse who registered and prepped patients before sessions. PCPs at the FQHC referred BMT patients with ongoing substance abuse. BMT prescribing was transferred to the twice monthly group BMT sessions, but patients continued to see their PCP for primary care. Group BMT included 30 min for registration, urine collection for drug testing, completion of self-assessment forms, and nursing assessment; and 90 min for open discussion and feedback, a facilitated harm reduction activity, psychoeducation, relaxation exercises, and BMT prescribing. The physician was available for 30 min following sessions to provide individual attention (e.g., BMT dose changes). Lunch and transit passes were provided as incentives. Clinicians met in between group sessions to discuss patient progress and plan activities.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): During development and preliminary evaluation, we assessed: 1) interest; 2) feasibility; and 3) patient satisfaction. The primary measure of success was patient attendance, which was used to confirm feasibility. We reviewed electronic health records and patient self-assessment forms to assess feasibility. Measures were sociodemographics, health insurance, co-morbidities, and attendance. During development, we conducted five focus groups with BMT patients to assess interest in combining BMT and group counseling. One focus group occurred after implementation and included participants of the group BMT pilot to assess patient satisfaction. Focus groups were audio-recorded, transcribed, and qualitative analysis used a grounded theory approach to elicit key themes. We will conduct an RCT in the future to assess effectiveness of group BMT at reducing substance abuse.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Between Feb and Aug 2014, the group BMT pilot included 13 sessions. Overall, 33 patients were referred by PCPs. Of these, 20 attended at least one session and 13 attended two or more sessions. Median attendance per session was 6 patients (range: 4–10) who attended a median of 3 sessions each. Participants were mostly middle-aged (median: 53), male (15/20), Hispanic (10/20) or non-Hispanic Black (10/20), publicly insured (20/20), and had at least one chronic medical (18/20) or mental health (16/20) comorbidity. Of the 33 participants in the 5 focus groups (range: 3–11 participants), most were middle aged (median: 50), male (28/33), and Hispanic (20/33). Key themes relating to interest included the desire for peer support to be part of BMT and concerns about confidentiality, time commitment, and loss of individualized physician time. Themes relating to patient satisfaction among the 3 participants who had also participated in the pilot were that group BMT delivered valuable lessons and imparted a sense of hope. A representative quote from a group BMT participant was, “every other Wednesday, I know I’m gonna be here, I’m gonna feel safe, I’m gonna learn something, and be around people I feel comfortable with.”

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1. There is interest in group medical visits for BMT. Our group BMT pilot was feasible and valued. 2. Patient concerns about confidentiality, time commitment, and loss of

individualized physician attention must be addressed. We start group BMT sessions by reviewing confidentiality rules; we only target patients who need increased treatment intensity; and we ask patients before each session whether they need to see the physician individually. 3. Our biggest challenge has been communicating treatment plans to PCPs and ensuring that patients with chronic health conditions also see their PCP for preventive care and chronic disease management. 4. Logistical challenges, such as clinical space, nursing support, and funding for incentives, required significant attention prior to implementation.

CARE PLUS: ADDRESSING MEDICAL AND PSYCHOSOCIAL NEEDS THROUGH TEAM BASED PRIMARY CARE AND CARE COORDINATION Melanie Martin; Kirsten Feiereisel; Nancy M. Denizard-Thompson. Wake Forest University School of Medicine, Winston-Salem, NC. (Tracking ID #2200209)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Psychosocial challenges are a driving force for readmissions and frequently cannot be adequately addressed in usual outpatient care settings.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Identify and characterize frequently readmitted patient population from urban safety net practices. 2. Implement *Care Plus*, a multidisciplinary care model to address patient engagement and improve satisfaction in this superutilizer population. 3. Significantly reduce admissions and emergency department (ED) utilization in this challenging population

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): *Care Plus* was launched in October 2013 to provide team based primary care and care coordination to frequently admitted adults and high emergency department utilizers from two safety net practices at a large academic medical center. A multidisciplinary team consisting of a lead physician, a nurse practitioner, a licensed clinical social worker with experience in mental health and substance abuse, a community health worker and an RN were assembled to develop and implement an individualized care plan for each patient addressing the unique medical and psychosocial needs of the patients. The team collaborates very closely with clinical pharmacists, a psychologist, a psychiatrist, pastoral care, palliative care and home health. Enrollment is blind to insurance status, however the practices traditionally serve high numbers of Medicaid, Medicare and dually eligible patients. At the time of patient enrollment, a comprehensive intake is conducted consisting of a survey of previous healthcare access, medication access, food and housing, educational background and habits to better identify individual challenges. Through steps of increased frequency of visits, home visits, addressing transportation and medication access challenges, and integrated behavioral health care, the goal of this program is to reduce admissions and ED utilization in this challenging population.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): *Care Plus* compares enrolled patients to their historical selves to determine the impact of the program on hospital and ED utilization. An initial goal was established as a reduction of admissions by 20 % and a reduction of ED utilization by 20 %. A greater understanding of the characteristics and psychosocial challenges of this population was desired to better understand the unique needs and most appropriately target resources and interventions.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Demographic data demonstrate a predominantly African-American population (73 %). The majority of patients have Medicaid (25 %), Medicare (40 %) or are dually eligible patients with both Medicaid and Medicare (21 %) with a smaller percentage being self pay (14 %). The participants have a high degree of psychosocial challenges, with preliminary data revealing 100 % unemployment, 90 % qualifying for food stamps and 31 % having not completed high school. In addition, 37 % report substance use (primarily alcohol or cocaine) and 65 % screen positive for depression (mild to severe) on PHQ-9. Preliminary data on the first 178 patients who had been enrolled for at least 6 months show that through this interdisciplinary team based approach that addresses both medical and psychosocial concerns, *Care Plus* has been able to decrease admissions in this patient population by 50 %, reduce 30 day readmissions by 40 % and reduce ED visits by 35 %.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): It is often psychosocial challenges such as food insecurity, low literacy, mental illness, substance use, lack of access to transportation and difficulty obtaining medication that drive readmissions. We provide a multidisciplinary care model that includes social work, integrated behavioral health and frequent patient touches that has successfully reduced readmissions and ED utilization in this challenging population.

CARING WISELY: A PROGRAM TO SUPPORT FRONTLINE PROVIDERS AND STAFF IN IMPROVING HEALTH CARE AND REDUCING COSTS Ralph Gonzales¹; Christopher Moriates¹; Alvin Rajkomar¹; Priya A. Prasad¹; Victoria Valencia¹; Christy K. Boscardin¹; Deborah Grady¹; J. Claiborne Johnston². ¹UCSF, San Francisco, CA; ²UT-Austin, Austin, TX. (Tracking ID #2199331)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Strategies that align frontline providers and staff with organizational leadership are needed to reduce health care costs and improve care within health care delivery systems.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To identify “hot spot” areas of low-value care/waste that frontline providers, staff and trainees have under their direct control. 2. To implement intervention strategies developed through collaboration between frontline project teams, implementation scientists, and organizational leaders. 3. To achieve a positive return on investment for the health care organization.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The Caring Wisely™ program was conceived by the UCSF Center for Healthcare Value (CHV) in partnership with the UCSF Medical Center. The program consists of 3 stages: 1) The Ideas Contest (2–4 weeks)—a campus and medical center-wide open call to all staff, providers, faculty and trainees to bring forward their best ideas for identifying hot spots or problem areas that could be targeted with focused efforts to reduce inefficiencies and health care costs; and 2) The Request for Proposals stage (4–6 weeks)—related to the top ideas selected from the Ideas Contest; and 3) The Project Implementation stage (12 months)—project and implementation science teams meet regularly to develop and implement an intervention strategy with the first test of change within 3–6 months, and final evaluation of effect at 12 months. Each project has a maximum budget of \$50,000. Project support plus implementation science faculty and staff support amounted to about \$200,000 for these 2 projects. A key feature of the Caring Wisely program is the partnership between project teams, the Caring Wisely implementation team (consisting of a director, program manager, data analysts, and implementation scientists) and the Caring Wisely steering committee (comprised of executive health system leaders in quality, operations, finance and information technology). Each project team designed multidimensional interventions that addressed predisposing (such as knowledge, attitudes and social norms), enabling (such as audit or environmental barriers and facilitators) and reinforcing factors (such as rewards, audit/feedback and opinion leader endorsements) that were relevant to the primary behavior change target.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Primary outcomes: utilization of red blood cell transfusions per 100 discharges and proportion of total respiratory therapies due to nebulizers. Return on investment is based on direct material costs (and respiratory therapist labor costs for nebulizers) divided by the cost of the program (\$200,000) at year 1. Appropriate statistical procedures accounting for clustering by specialty, provider and patient, as well as interviews and surveys with project team members, will be completed in time for presentation at the annual meeting.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): There were 132 ideas, from which 20 complete project proposals were submitted in year 1. Submitters included doctors, nurses, pharmacists, administrators, and IT staff from a range of levels including residents, clinical fellows, assistant professors and full professors. During the Caring Wisely project period (July 2013–June 2014), average RBC transfusion rates per 100 hospital discharges per quarter declined 10.0 %. Using the first 2 quarters as a baseline period, there were an estimated 790 transfusions saved over the subsequent 6 months attributable to the Caring Wisely program. There was a general increase in transfusion rates among non-intervention units during the same time period. Median hemoglobin levels prior to transfusion during the project period were 7.5–7.8 mg/dl across both groups, and did not vary significantly over time. In the year prior to Caring Wisely, the nebulizer project team had completed a version of their intervention with the hospital medicine service. This resulted in a significant decline in the proportion of treatments due to nebulizers from 0.9 to about 0.7 among target services, and maintained during the Caring Wisely period. Among non-targeted services, the nebulizer proportion showed a small decline to 0.85. Based on the observed (0.69)-to-expected (0.85) nebulizer utilization during the Caring Wisely period, one estimates approximately 3988 nebulizer treatments saved. Based on an average cost per unit RBC of \$260, and the average cost per nebulizer treatment (labor+materials) of \$66.19, the estimated ROI in year 1 was 2.34.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Applying implementation science principles to the intervention design strategies was a key factor in the success of Caring Wisely. These principles included stakeholder engagement, tailoring and adaptation of the intervention to the target audience, and rapid-cycle process

measurement and feedback. In each project, the PRECEDE-PROCEED was used to insure that each intervention design included complementary elements of effective behavior change—intended to increase awareness and motivation to change, to make change “easy”, and to reward/reinforce change.

CHOOSING WISELY IN PRIMARY CARE: RE-DESIGNING DARTMOUTH-HITCHCOCK’S GENERAL INTERNAL MEDICINE (GIM) PREOPERATIVE EVALUATION PROCESS TO DECREASE UN-NECESSARY TESTING AND IMPROVE EFFICIENCY John Matulis. Dartmouth-Hitchcock Medical Center, Lebanon, NH. (Tracking ID #2198203)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Routine preoperative testing persists as a wide-spread practice despite strong evidence suggesting this service provides little value to patients.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Specific Aim # 1: Reduce the rate of unnecessary preoperative testing, defined by published guidelines, in patients undergoing preoperative assessment for all low risk surgeries in the Dartmouth-Hitchcock GIM clinic from 36 to 10 % by June 2015. Specific Aim # 2: Decrease the average, scheduled appointment time for preoperative visits from 47 to 30 min by June, 2015.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Dartmouth-Hitchcock Medical Center, an academic tertiary care center in rural New England, operates a GIM clinic staffed by 16 internists, 7 associate providers (physician assistants and nurse practitioners) and 39 internal medicine residents providing primary care for approximately 20,000 patients. Annually, the clinic performs around 850 preoperative evaluations. All of these visits are completed in anticipation of low or intermediate risk surgeries. Prior to this intervention, there was no standardized approach in scheduling or performing these evaluations. **Description:** A multi-disciplinary improvement team was created in May of 2014. PDSA cycles consisted of creation of a dedicated associate provider run preoperative clinic, operationalizing a scheduling scheme, educational interventions, and employment of electronic medical record tools to facilitate reliable completion of these visits. At the time of submission about 25 preoperative visits per month, or 33 % of preoperative visits are being seen in the preoperative clinic. Process changes were informed by a clinical microsystems approach and tools such as cause and effect diagrams, process mapping, and qualitative methods were used to inform the interventions. Statistical Process Control (SPC) methods were employed in data collection and analysis.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Outcome Measure: Percentage of patients receiving unnecessary diagnostic testing. Patients who received at least one unnecessary preoperative test were counted in the numerator. Total number of patients undergoing preoperative evaluation composed the denominator. An unnecessary test is one that is ordered and associated with the visit and is not in concordance with the 2014 ACC/AHA perioperative guidelines for evaluation of non cardiac surgery. Data Source: manual chart extraction Outcome Measure: Number of unnecessary tests ordered. Patients who received unnecessary EKG, CBC, or metabolic testing were counted using the above mentioned guidelines. Data source: manual chart extraction Process Measure: Average scheduled visit time for preoperative visits. The numerator was the total number of minutes of scheduled clinic time dedicated to preoperative visits while the denominator was the total number of preoperative visits performed. Data Source: Electronic Medical Record Query

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Compared to the baseline rates of 36 % of preoperative patients receiving unnecessary testing in the GIM clinic, the newly designed Associate provider preoperative clinic showed rates of 5 % within 3 months of implementation. This difference in rate of unnecessary testing was statistically significant by accepted rules of SPC. Numbers of EKGs, CBC and metabolic blood tests ordered similarly showed statistically significant decreases while numbers of imaging and other cardiac tests showed non-statistically significant decreases. Overall, the time of scheduled visit showed a significant decrease from 48 to 40 min.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A dedicated clinic directed towards providing a particular subset of primary care can improve reliability, guideline concordance, efficiency and patient access. These clinics may also function as a powerful tool in minimizing provision of low-value services. In our academic, GIM practice a preoperative clinic was effectively staffed with associate providers. Tools in the electronic medical record, particularly template directed documentation and patient completed questionnaires can be powerful tools in directing clinicians towards guideline focused care while simultaneously improving efficiency. Identifying

appropriate patients for inclusion in these clinics while optimizing primary care provider collaboration are important challenges moving forward. Our preoperative clinic showed promising gains in reducing rates of unnecessary testing while simultaneously improving efficiency. It is our hope that with continued use of established quality improvement methods and collaboration with surgical and anesthesia services this clinic can be expanded to include a larger percentage of preoperative appointments across all primary care service lines.

COLLABORATIVE APPROACH TO OBESITY COUNSELING IN PRIMARY CARE: JUMPSTART TO WELLNESS Melissa M. Page; Jillian Regan; Laura K. Snyderman; Caitlin Toomey; Deborah Blazey-Martin. Tufts Medical Center, Boston, MA. (Tracking ID #2198362)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Primary care doctors are in an opportune position to identify obese patients; however, time constraints and lack of experience in weight management make it difficult to treat obesity in the primary care setting. How can primary care physicians collaborate with other specialties to solve this problem?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To identify barriers to effective weight loss counseling in the primary care setting and to referrals for weight loss. 2. To create a collaborative pilot program that makes it easier for primary care providers to refer morbidly obese patients with a BMI of 40–45 to weight loss counseling, and to assess the efficacy of this program.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): General Medical Associates (GMA) at Tufts Medical Center is a large academic, outpatient primary care practice with 34,000 patients, 30 attendings, 6 nurse practitioners and 72 residents. The Tufts Weight and Wellness Center (WWC) provides nutrition counseling, meal replacement programs, behavioral health counseling, pharmacologic treatment and bariatric surgery. Our collaborative pilot served GMA patients seen 2/14-9/30/14 with BMI 40–45. The Jumpstart to Wellness (JSW) Program was created to provide referral-based weight loss counseling to primary care patients and overcome physician-identified barriers to such referrals. Physicians identified concerns over lack of time, prematurely sending patients for bariatric surgery, prohibitive copayments, lack of clarity about appropriate referrals, and a desire to make referrals in a sensitive, patient-centered manner. JSW was developed with two primary components: an easy referral mechanism during a primary care office visit and a dietitian-initiated weight loss program. During a primary care visit, medical assistants identify patients with a BMI of 40–45 and alert the PCP by leaving a JSW brochure on the exam room door. The provider can then initiate a conversation about weight management and refer the patient to JSW if deemed appropriate. Patients referred to JSW receive three dietitian visits designed toward understanding the patients' needs and challenges, providing education, initiating food and exercise logs, and reviewing barriers and progress. The dietitian and patient then identify together which program track is most appropriate: medical weight loss, meal replacement, or bariatric surgery. The dietitian communicates the decision to the PCP and facilitates transition to the appropriate program.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Program effectiveness will be evaluated by tracking weight loss, patient attendance, length of time between visits (days), ending weight, BMI, and weight loss track chosen.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): During the pilot period, 624 patients with a BMI 40–45 were seen in GMA, 246 (39.4 %) were referred to JSW, and 139 (56.5 %) attended at least one visit. Of these patients, 39 (28 %) continued on a WWC weight loss track: 79 % of patients chose medical weight loss or meal replacement and 21 % chose a bariatric surgery path. Of the patients who attended all three visits ($n=37$, 26.6 %), the average weight loss was 3.98 lbs over an average period of 64 days (range of +6.4 to -30.4 lbs, median of 3.6 lbs).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Jumpstart to Wellness is an effective way for primary care physicians to refer obese patients to appropriate and effective weight loss counseling. While participants successfully achieved weight loss, weight loss remains a sensitive issue and a large percentage of patients referred did not complete the program. Further investigation revealed that those who did complete the program were more medically complex, as evidenced by higher BMI, older age, more office visits to their PCP and specialists, and more co-morbidities. We will determine if these differences are statistically significant once we have a larger patient population. We will use this information to target patients in our primary care practice who may benefit the most from the Jumpstart program and to better understand barriers to completion.

COMPLETE CARE MODEL FOR DIABETES CARE WITHIN A PATIENT CENTERED MEDICAL HOME—PRE-VISIT PLANNING, AT-VISIT EFFICIENCY AND INTER-VISIT CARE Jaishree Hariharan²; Natasha Parekh²; Jacqueline Mihm²; John Donehoo²; Cynthia Murphy²; Deborah Simak²; Gary Fischer¹. ¹University of Pittsburgh, Pittsburgh, PA; ²University of Pittsburgh Medical Center, Pittsburgh, PA. (Tracking ID #2197838)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Diabetes care is challenging and despite multiple interventions to aid physicians in caring for patients, and the presence of a diabetes educator, the clinic persistently had 15 % of diabetics with A1C \geq 9.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To redesign diabetes care to be patient-centered, proactive and team-based, engaging patients throughout the continuum of care with an emphasis on managing poorly controlled diabetics (A1C \geq 9) 2. Increase appointment show rate, maximize visit efficiency and intensify inter-visit care using standardized protocols and medication titration. 3. Incrementally improve all diabetes outcomes, especially mean A1C in this cohort.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): University of Pittsburgh Physicians- General Internal Medicine (UPP-GIM) is a large urban academic primary care practice with approximately 1523 diabetes patients. These patients are cared for by 34 faculty and 52 residents who are grouped into four firms in a PCMH. In January 2014, a need for diabetes redesign was recognized as 15 % of patients had A1C \geq 9. A multi-disciplinary diabetes team was created to redesign diabetes care. The team met regularly, reviewed best practices, current literature, created protocols, standardized documentation, obtained software for glucometer downloads and established a care model to be implemented in phases. Phase 1 (March 2014) involved pre-visit planning. All patients with A1C \geq 9 scheduled for a PCP visit the following week were identified from the provider schedules. They received an outreach phone call from their firm nurse reminding them of their appointment, encouraging home glucose and blood-pressure monitoring, and requesting that they bring their logbook /glucometer to their appointment. Medication and transportation needs were assessed and appropriate referrals were placed based on patient needs. Phase 2 (June 2014) involved improving at-visit efficiency. MD huddles with MA to review schedule for any patient needs at start of clinic. The medical assistants (MA) prepares patients by having their glucometer downloaded, feet exposed and point of care A1C performed if due prior to exam. MD creates the care plan and refers to diabetic educator/pharmacist /nurse as needed for inter-visit care. Phase 3 (July 2014) involved inter-visit care by diabetic educators to coach, troubleshoot and manage patients using a medication-titration protocol. Phase 4 (Jan 2015) involves detecting and addressing mental health challenges in diabetes. Future goal is to include patients with A1C $>$ 8.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Process measures include percentage of patients reached by phone for pre-visit planning; improvement in appointment show rate for patients with A1C \geq 9, increase in glucometer downloads at-visit and percentage of patients following up with diabetic educators. Outcome measure is improvement in mean A1C and A1C \geq 9 rates in a year.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): In January 2014, the clinic had 1523 unique diabetic patients of whom 229 (15 %) had an (A1C \geq 9) which formed our cohort. Our cohort had a higher percentage of African-Americans compared to all diabetics (50 %, vs 38 %) and 59 % of them were between (40–64) years old. Through September 2014, on average, 75 % of scheduled patients were reached by our nurses for pre-visit planning. The appointment show rate improved from 70 to 76 % for this cohort. Glucometer downloads averaged 28 per month. When comparing encounter rate for our cohort with usual care, we found 4.0 office visits per cohort patient (vs 3.3) and 9.8 telephone encounters per cohort patient (vs 6.4). Increase in encounter intensity was provided primarily from non-MD members of the team. In addition, 54 % of cohort patients encountered the Diabetes Educator (vs 20 %). There is suggestion in the literature that increasing intensity of encounters and team care will improve compliance. Mean A1C reduced from 10.8 to 9.7 over the last 6 months. More outcome data is expected by March 2014.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Diabetes care requires a coordinated proactive multi-disciplinary team-effort at different points within the healthcare system and continued effort to engage patients and improve outcomes. Targeted interventions can be implemented in phases and integrated into clinic workflow. Sustaining improvements remains a challenge.

COPILOTS: A COLLABORATIVE PAIN INTERVENTION FOR LONG-TERM OPIOID TREATMENT SAFETY Serena L. Roth¹; Sarah Ricketts²; Naum Shaparin²; Charleen Jacobs¹; Darlene Desantis²; Laila Khalid¹; Lorlette Haughton²; Joanna L. Starrels¹. ¹Albert Einstein College of Medicine & Montefiore Medical Center, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2194876)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Patients with chronic pain frequently have comorbid mental health and substance abuse problems leading to poor pain outcomes and greater risk for opioid analgesic misuse, yet primary care providers may lack the time and training to optimally manage these complex issues; a collaborative care model can integrate pain care management and behavioral health into primary care settings.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The objectives of this project are: 1) to develop and pilot a collaborative care model for chronic pain management in primary care; and 2) to determine whether the collaborative care model is associated with: improved screening for mental health and substance use problems, improved use of safer opioid prescribing practices (written controlled substance agreement, drug testing), and improved patient pain, functional, and substance use outcomes.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): This program is being implemented in the Montefiore Family Care Center's Internal Medicine Practice, a teaching clinic in Bronx, NY serving predominantly low-income and racial/ethnic minority patients. Eligible patients are adults prescribed long-term opioids (≥ 3 prescriptions in prior 6 months) for a chronic pain condition, who have suboptimally controlled pain and/or psychosocial challenges, and completed ≥ 2 visits with their PCP in the past year. Exclusion criteria are prescription of long-term opioids solely for treatment of opioid use disorder (addiction) or prescription of long-term opioids by an outside provider. The Collaborative Pain Intervention for Long-term Opioid Treatment Safety (CoPILOTS) engages a multidisciplinary team to improve patients' pain, function, and behavioral health. The CoPILOTS team includes a pain care manager (nurse practitioner), behavioral health manager (psychologist), two primary care champions (PCPs), a psychiatrist and a pain specialist. Key program components include: 1) monthly assessments with the pain care manager focusing on pain, opioid use, and screening for mental health and substance use problems; 2) team-based recommendations to the PCP; 3) a 6-week patient self-management program; 4) evaluation and treatment with the behavioral health manager if indicated; and 5) care management including facilitated referrals for specialty services. After being referred to CoPILOTS by the PCP, each patient is invited for a comprehensive intake visit with the pain care manager. Patients are referred to the behavioral health manager for evaluation if they screen positive during the intake or subsequent visit for depression (PHQ-9), anxiety (GAD-7), trauma, or substance misuse (AUDIT-C, COMM, and NIDA quick screen).

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We are using EMR data, interrupted time series analysis and non-FCC controls, to determine whether CoPILOTS is associated with: 1) improved screening for mental health and substance use problems among patients prescribed opioids for chronic pain; 2) improved use of safer opioid prescribing practices; and 3) improved patient pain, functional, and substance use outcomes. Feasibility outcomes will include patient and provider acceptability and satisfaction.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): In the first 3 months, 36 patients were referred to the CoPILOTS program; referring PCPs cited suboptimal pain control in all 36, and psychosocial issues in 35 patients. Of the 36 referred, 26 (72 %) completed the initial intake evaluation; 65 % were female. Of the 10 who did not complete an intake, 8 were not interested, 1 was ineligible, and 1 was unable to complete the intake due to distress. Among the 26 who completed intakes, 21 (72 %) had a positive mental health or substance use screens; of these, 12 (57 %) completed a behavioral health evaluation within 30 days. Patients had a high severity of pain, poor physical and general function, significant pain catastrophizing, and high rates of psychological symptoms and exposure to trauma.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): After only 3 months of the intervention, we have identified many patients with significant mental health and substance use problems of which PCPs were not fully aware. Many patients on chronic opioid therapy considered themselves too physically or psychologically disabled to participate fully in the self-management program. Patients reported severe pain with significant impact on their physical and psychological wellbeing. Collaborative care for chronic pain management has potential to improve care for complex patients with chronic pain and behavioral health problems. Linking patients to behavioral health care is particularly important. Self-management programs may be more successful

with patients who are less severely disabled. We will continue to revise and examine the CoPILOTS program, and if successful, it may be a model for care delivery in other primary care settings.

CREATION AND EVALUATION OF A PROCESS FOR FALLS RISK ASSESSMENT AND INTERVENTION IN AN ACADEMIC GENERAL INTERNAL MEDICINE CLINIC Kathryn A. Brennan³; Emily K. Sturkie³; Brooke B. McGuirt²; Shana Ratner¹. ¹UNC Chapel Hill, Chapel Hill, NC; ²UNC Internal Medicine, Chapel Hill, NC; ³University of North Carolina, Chapel Hill, NC. (Tracking ID #2193611)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Falls in the elderly population are associated with significant morbidity and mortality, and patients at risk for falling often go undetected in the outpatient setting.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) To create a standardized and streamlined approach for detecting patients who are at risk for falling. 2) To implement evidence-based interventions to reduce injury and fracture risk for patients at risk of falling.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Falls in the elderly population occur frequently and remain a public health problem in the outpatient setting. The Centers for Disease Control and Prevention (CDC) estimate that one out of every three patients over the age of 65 have fallen in the past year but less than half of these patients discuss this with their healthcare professional. The University of North Carolina Internal Medicine Clinic (IMC) is a general academic clinic with a patient population of approximately 14,000 patients, 31 % of whom are over the age of 65. Prior to our intervention, the clinic had no standardized method of assessing a patient's risk of falling. We utilized multiple Plan, Do, Study, Act (PDSA) cycles to develop a fall risk screening process that could be integrated into a busy outpatient clinic setting. We developed a protocol consisting of a single nurse administered screening question during the patient rooming process: "Have you had any falls in the past year?" If a patient screened positive based on this initial question, the nurse would be prompted to offer the provider a clinical decision support tool. The clinical decision support tool is a bright orange double sided paper form that is intended to both notify the provider that this patient may be at risk for falling and also prompt the provider to consider specific evidence-based interventions such as physical therapy referral, Fracture Risk Assessment Tool (FRAX) calculation to assess for need for bisphosphonate, vitamin D supplementation and medication review. We initially began by working with two nurses who were familiar with the clinic workflow. They were taught the steps to the screening process and how to document patient's fall risk in the electronic medical record system. Physicians working with these nurses were contacted and informed about the screening process. After this initial trial, participating nurses and physicians were interviewed and charts were reviewed to evaluate the process. We then performed a second and third trial with the addition of more nurses and providers. Each trial incorporated feedback and lessons learned in the previous trials. By the end of the third trial, we had six nurses participating with a plan to transition to clinic-wide screening.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our primary outcome was the number of patients age ≥ 65 years old who were screened for fall risk. Secondary outcomes included the percentage of patients who screened positive and the number and type of provider interventions delivered.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): A total of 76 patients age ≥ 65 years old were screened during a pilot of about 3 weeks. The majority of patients were screened in the final week (46 patients). Twenty-nine patients (38.2 %) screened positive to falling in the last year. Of these 29 patients that screened positive, 16 patients had at least one documented evidence-based intervention (range 1 to 3 interventions, mean 1.8 interventions). Documented interventions included vitamin D supplementation (9 patients), physical therapy referral (6 patients), medication review with an aim to reduce delirigenic medications (6 patients), FRAX Calculation +/- DEXA scan (5 patients), community exercise program referral (2 patients). Feedback was obtained from both nursing staff and physicians. Nurses overall were satisfied with the simplicity of the one-question screening tool. Provider decision support forms were placed in patient rooms based on nurse feedback to ensure all nurses had easy access to these documents. Physicians were satisfied with the bright color of the form, which served as an effective reminder. Physicians suggested other interventions to be incorporated into the decision tool. Based on these suggestions, we added information regarding county-specific community-based exercise programs to the form. Physicians

also suggested that we build automated best practice advisories within the electronic health record (EHR).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Using a single question screening protocol to assess whether patients age ≥ 65 years old have fallen in the past year is a simple way to incorporate fall risk screening into busy clinic workflow. The addition of a clinical decision support tool in this setting can promote the use of evidence-based interventions to prevent falls and fractures. Using multiple small tests of change, we were able to modify and improve the process over the course of three weeks. Future efforts will be geared towards integration in the EHR and resident curriculum development.

DEVELOPMENT OF A PATIENT EMPOWERMENT PROGRAM (PEP) BASED ON STANDARDIZED PATIENT (SP) METHODOLOGY Lisa Altschuler; Joseph Plaksin; Sarita Kundrod; Sondra Zabar; Adina Kalet. NYU School of Medicine, New York, NY. (Tracking ID #2184475)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can Standardized Patient (SP) training methodology be adapted into a Patient Empowerment Program (PEP) that activates underserved minority, low literacy “real” diabetic patients in the medical encounter?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To determine: 1. If PEP increases patient activation, preferences for medical decision-making, and diabetes self-management behaviors in diabetic patients. 2. The acceptability, feasibility, and replicability of implementing PEP across three urban hospital centers serving underserved populations in NYC. 3. If PEP leads to a measurable difference in hemoglobin A1c.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We recruited patients with type 2 diabetes (DM) to participate in PEP, a 4-hour, two-session workshop run by a Health Psychologist (L.A.) with extensive experience in HCP education. In the first session, participants discuss shared decision-making (SDM) in the medical encounter, view trigger videos of patient-HCP interactions, and rate both parties using a behaviorally anchored SDM checklist. In the second session, participants role-play several scenarios with Standardized Healthcare Providers (SHPs). After each scenario, participants rate the performances and practice giving feedback to each other and the SHPs. Following the standardized role-play scenarios, participants apply what they have learned in a role-play scenario with a SHP, created specifically for each participant based on self-reported difficulties with DM. Finally, participants debrief as a group with SHPs and research personnel to create a SMART goal based action plan targeted to improve SDM in future medical encounters and DM self-care.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We survey patients to assess for change in activation, preferences for control in medical decision-making, and self-reported DM self-management behaviors at baseline, immediately after the intervention, and 3 months after the intervention. Hemoglobin A1c is obtained by chart review at baseline and after 3 months. Program evaluation includes participants’ opinions on the acceptability and feasibility of PEP as well as which specific parts of the intervention they felt were most beneficial.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): To ensure the curriculum and materials were patient-centered and appropriate, we held focus groups with DM patients to elicit their experiences and opinions. Overwhelmingly, participants stated that they would volunteer to be a part of PEP and believed they would learn a lot from the experience. A pilot of the PEP intervention was then held with six of these patients. They were able to complete the role-playing scenarios and give appropriate feedback to their peers and the SHPs. Participants reported that the intervention gave them specific tools to interact with their HCPs and get the most out of their appointments, including being honest about health beliefs and behaviors, speaking up about preferences, asking HCPs to slow down and explain more clearly, and voicing difficulties with the intent to come up with a plan together. Participants reported that the completion of the action plan made them feel much more prepared for their next medical encounter, supported by the other members of the group, and motivated to follow through on their specific goals. Based on their feedback, we revised the scripts and re-filmed the patient-HCP trigger videos, amended the standardized role-playing scenarios to be more clear and realistic to patient experiences, and created additional individualized role-play scenarios. Currently, participants are being recruited from clinic to participate in further pilot testing of the PEP intervention. Our goal is to recruit 120 participants across three sites in order to have 40 participants complete the intervention over the next year.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Using SP training methodology to create PEP is feasible, acceptable, and enjoyable to volunteer patients with DM from an underserved, minority, and low literacy population at a large urban safety-net hospital center. Active patient participation in the design of the program maximizes relevancy and engagement and allows fine tuning for cultural differences and low literacy. Practical barriers to implementation across all three sites include limited institutional and patient resources. We found that providing support for transportation to and from the sessions for patients is key. Identifying appropriate space—including a conference room in the clinic at each site and a simulation center which enables role-plays in authentic environments and videotaping for later review—are difficult. Guided by the outcome data we will refine PEP so that it can be delivered with maximum impact in pragmatic ways including creating flexible, technology supported blended versions (e.g. session one as an interactive webinar) and convenient times and locations (e.g. immediately following DM group visits).

E PLURIBUS UNUM: INTERDISCIPLINARY BEDSIDE MORNING ROUNDS ON THE GENERAL MEDICINE WARDS Michael F. Krug¹; Andrew A. White²; Naomi L. Maxey²; Christy McKinney². ¹The University of Washington, Seattle, WA; ²University of Washington, Seattle, WA. (Tracking ID #2194941)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Insufficient coordination between doctors and nurses on our inpatient medicine floors has, at times, resulted in inferior patient care and frustration among patients and providers.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) Optimize communication between physicians, nurses, and pharmacists 2) Make patient care more proactive and efficient 3) Promote a culture of teamwork and safety

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The inpatient medicine service at our urban academic medical center is a major teaching site that is primarily staffed by resident-led teams. Historically, physician teams rounded in the mornings independently of pharmacists or nurses, and interprofessional communication was ad hoc. We implemented a pilot whereby bedside morning rounds would be coordinated to include the physician team, the nurse for the day, and a pharmacy representative. During the pilot, two of the four physician teams coordinated rounds in this fashion (intervention group), and the other two teams did not (control group). Nurses cared for patients in both groups. Pharmacy presence was expectation during morning rounds in both the intervention and control groups. Rounds were coordinated via a posted rounding schedule filled out by the physician teams and “heads up” phone calls from the physician team to the nurses. Rounds were expected to last 15 min per patient or less in the intervention group. Bedside communication was not structured, but open exchange of concerns was encouraged.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We conducted an anonymous survey of physicians and floor nurses after they had worked extensively during the pilot. The survey assessed teamwork attitudes using questions from the validated Safety Attitudes Questionnaire (SAQ) and solicited perspectives on morning rounding. Most survey questions used a 5-item Likert scale ranging from “strongly agree” to “strongly disagree.” Because too few participants reported negatively, we combined “strongly disagree,” “slightly disagree,” and “neutral” into one category. We compared the responses of the intervention group physicians to the control group physicians, and we also compared the responses of the doctors to the responses of the nurses. Using electronic paging data, we evaluated whether there was a difference in number of pages to physicians in the intervention versus the control groups. We used t-tests and chi-square analysis to compare survey responses and paging data.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We collected survey data from 79 physicians (34 attendings, 45 interns/residents) and 22 nurses. Based on Likert scale responses, 76 % of physicians and 87 % of nurses strongly preferred coordinated morning rounds. There was no statistically significant difference in teamwork attitudes between the intervention and control physicians (all p-values > 0.05), although the results seem to suggest a trend toward more favorable teamwork attitudes in the intervention group. There was no significant difference in morning report attendance, time for teaching during rounds, or time for management discussion during rounds between intervention and control physicians (all p-values > 0.05). Nurses were less likely than physicians to feel that they were working as a well-coordinated team together ($p = .05$). Physicians were more likely to know the first name of the nurses they worked with than vice-versa ($p = .04$). The number of pages sent to physicians was statistically different between intervention and control groups, though this difference is unlikely to be clinically meaningful (28.1 pages/team/day in the intervention group vs. 28.7/team/day in the control group) ($p < 0.0001$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Implementing interdisciplinary bedside morning rounding was achievable on the general medicine ward of a major academic medical center and was strongly preferred by doctors and nurses. This intervention did not statistically improve teamwork attitudes or dramatically reduce the frequency of pages during the initial 6-month pilot, however we are optimistic that tangible benefits will be seen as we optimize our rounding system moving forward. Interdisciplinary rounding did not negatively influence time for teaching during rounds, time for management discussion during rounds, or resident morning report attendance.

EARLY HOSPITALIST SCREENING AND ANTIBIOTIC RECOMMENDATION INTEGRATED WITH ANTIBIOTIC STEWARDSHIP PROGRAM

Andrea Porrovecchio²; Priya Nori²; William Southern¹. ¹Montefiore, Bronx, NY; ²Montefiore Medical Center, Bronx, NY. (Tracking ID #2191694)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): To ensure appropriate antibiotic choice, dose and duration our antibiotic stewardship team (ABS) makes recommendations 72 h after admission, however, earlier screening and intervention by a hospitalist might lead to more appropriate antibiotic regimens and improved patient outcomes.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) Develop a process in which a hospitalist can, on hospital day one, screen, make recommendations, and refer cases to the antibiotic stewardship team. 2) Develop a standardized tool for hospitalists to use to screen and make early antibiotic recommendations for admitted patients with pneumonia, urinary tract infection, and skin/soft tissue infections.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In a community hospital associated with a large urban academic medical center, the Directors of Hospital Medicine and the Antibiotic Stewardship Program collaborated to create the Early Hospitalist Screening and Antibiotic Recommendation program. Before the intervention the antibiotic stewardship team would screen and make antibiotic recommendations 72 h after admission. The intervention consisted of trained hospitalists acting as extensions of the antibiotic stewardship team to intervene on patients with pneumonia, urinary tract infection, and skin/soft tissue infection, on hospital day one. The multifaceted intervention included: 1. **Hospitalist screening:** A hospitalist representative was present at interdisciplinary team rounds each morning. New admissions for the diagnosis of PNA, UTI, and SSTI were flagged and subsequently screened by the hospitalist using a standardized tool. Comorbid illness, risk for nosocomial infection, appropriateness of diagnosis, appropriateness of initial antibiotic choice and dose were considered. 2. **Hospitalist recommendations:** Based on the screen and using a standardized algorithm for empiric antibiotic regimens tailored to local epidemiology, the hospitalist contacted the primary team and made recommendations for change of antibiotics choice, dose regimen, or work up if appropriate. 3. **Early Referral to ABS:** If Infectious Disease consultation had already been made, if the primary team disagreed with hospitalist recommendations, or if the case was judged by the hospitalist to warrant early ABS involvement, these cases were immediately referred to the ABS for recommendations on hospital day one. All cases screened were referred to the ABS so that they could follow up as per routine on hospital day three. To standardize the intervention and to aid the hospitalists with screening and recommendations a standardized screening tool was developed collaboratively by the Directors of Hospital Medicine and the Antibiotic Stewardship team.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We measured the number of patients reviewed, the proportion that resulted in a hospitalist recommendation, and the proportion of the hospitalist recommendations that were adhered to by the primary care team. In addition, we examined each hospitalist recommendation to determine the nature (eg broaden coverage, narrow coverage, dose adjustment, further work up). In a before-after study, we will be comparing the length of stay (LOS) for this population against the LOS of the similar diagnosis in the same geographic unit in the same months (Aug-Oct) one year prior.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): One hundred seventy-five cases were eligible for screening based on admission diagnosis over a three month period. Of those cases screened, 70 % had recommendations made by the hospitalist representative on hospital day one. Examples of recommendations made include change in antibiotic dosing based on GFR or age, further work ups recommended, expansion or change of regimen based on clinical factors and microbiology history. Of those cases where recommendations were made, 75 % of the time the primary team adhered to the recommendations.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Early hospitalist screening and recommendations for antibiotic stewardship are feasible. In addition, the majority of the time, the recommendations are adhered to by the primary team.

ENHANCED CARE PROGRAM: A MODEL FOR COMPLEX CARE MANAGEMENT

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Medically complex individuals with multiple comorbidities often have unplanned care, resulting in frequent ED utilization, high admission and readmission rates, and high healthcare expenditures.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Our innovation is the design and implementation of an Enhanced Care Program (ECP) to meet the needs of complex, high-utilizing individuals. In line with the Institute for Healthcare Improvement's triple aim, the program aims to: reduce unnecessary healthcare utilization, improve the continuity and quality of care, and improve the patient experience of complex, high-utilizing individuals.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The ECP is being implemented in the University of Pittsburgh Physicians General Internal Medicine practice in Oakland (UPP-GIMO) in collaboration with UPMC Health Plan (UPMC-HP), a major insurer in western Pennsylvania. Individuals are invited to participate in the ECP if they meet the following criteria: 1) "Care Needs Index" score of 3 or greater on a scale of 0-5 (a risk score based on prior avoidable utilization, gaps in care, medical condition resource intensity, and predicted utilization calculated by the UPMC-HP for every patient) or >1 inpatient hospitalization or >5 ED visits in the previous year; 2) 18 years of age or older; 3) UPMC-HP member; 4) Receive primary care at UPP-GIMO; and 5) Agreed to participate. The ECP is embedded within a patient centered medical home primary care practice. The ECP team consists of one full-time physician, two part-time physicians, a full-time nurse care manager, a full-time medical assistant, a part-time psychologist, and a part-time psychiatrist. After a comprehensive assessment, a care plan is developed and agreed upon by the patient and the ECP team. Patients have regular face-to-face and phone call follow up with the ECP team, including 24/7 direct access to the ECP team via the ECP Direct Cellphone. The ECP team follows patients in the hospital and communicates with the ED when patients present to the ED. Patient care and service needs are discussed by the ECP team during weekly huddle meetings, at which time individual care plans are modified as needed.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Data will be obtained from an electronic ECP database, the electronic health record, and the UPMC Health Plan. Process measures include number of patients screened, enrolled, and refusing to participate in the ECP, and number of visits and phone calls per actively enrolled patient with the ECP team. Our primary outcome of interest is the number of hospitalizations per patient over the course of the intervention. Other utilization measures include number of ED visits, specialist visits, and ECP primary care provider (ECP-PCP) visits per patient. Continuity measures include the proportion of patient visits with the ECP-PCP out of all providers and number of unique providers who see the patient. Quality of care outcomes include adherence to HgbA1C goals, blood pressure goals, and age-appropriate preventive care services. Finally, patient satisfaction will be assessed through patient satisfaction surveys. We will compare outcomes with both pre/post measurements and propensity-matched controls from the same geographic area insured by the same insurer.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): From the start of the program in July 2014 to October 2014, 60 individuals were enrolled and 5 dropped out, leaving 55 actively enrolled patients. Average age of actively enrolled participants is 49 years. Seventy-six percent of participants are female. Common co-morbidities include: asthma (25, 45.5 %), diabetes (25, 45.5 %), mental illness (19, 34.5 %), osteoarthritis (19, 34.5 %), and congestive heart failure (11, 20 %). In the 12 months prior to enrollment, 34 % of ECP participants had an ED visit per month and 7 % of ECP participants had an unplanned hospitalization per month. Average number of ED visits and hospitalizations per patient in the 12 months prior to enrollment were 7.5 and 0.9, respectively. We plan to evaluate all process and outcome measures discussed above in July 2015.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Thus far the team has learned it takes time and frequent interactions to build trusting

relationships with these patients. It is essential to keep patients engaged through continuous contact, a large portion of which has been occurring via 24/7 telephone access to the team. Behavioral health resources are essential given the high rate of mental health illnesses in these patients. Highly coordinated care and a multi-disciplinary team are required to care for these patients, and each of these patients has complex, individual care needs. Continual consideration of the optimal composition of the ECP team will be required.

ENHANCED SMOKING CESSATION SERVICES VIA ON-SITE NICOTINE REPLACEMENT THERAPY (NRT) IN AN OPIOID TREATMENT PROGRAM (OTP) Melinda M. Katz; Shomari M. Harris; Soteri Polydorou; Markos D. Emmanouel; Ellie Grossman. New York University School of Medicine, New York, NY. (Tracking ID #2192491)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): What are effective methods for enhancing smoking cessation among a high-risk population of patients in treatment for opioid dependence?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Promote interest in smoking cessation among patients and staff at an opioid treatment program 2. Enhance confidence in addressing smoking cessation among patients and staff 3. Provide patients with short-term access to free nicotine replacement therapy and optimize use of the state telephone quitline service

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The program targeted patients enrolled in an opioid treatment program ($N=375$) at an urban safety-net hospital with a current smoking prevalence of approximately 85 %. The program provides methadone and buprenorphine and offers a wide range of daily group and individual counseling activities to support patients' recovery. For this pilot initiative, a part-time staff member approached patients in public program areas, group counseling sessions, and via word-of-mouth among patients and staff. Patients were asked if they had smoked even a puff of a cigarette in the past 30 days, and if so, were offered nicotine replacement therapy (NRT) patches on-site and given educational brochures about local smoking cessation services. Smokers were encouraged to accept referral to the New York State Smokers' Quitline; for those interested, staff helped patients complete the referral form and faxed it to the quitline. Smoking cessation program staff also provided informal education on tobacco treatment for interested OTP counselors. The part-time smoking cessation staff member was available on a limited basis for brief sessions of motivational interviewing; however, this service was not intended to provide comprehensive counseling on-site for smoking cessation. Its purpose was to optimize access to NRT and the state quitline service as a means to 'kickstart' local discussion and focus on smoking cessation.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Quantitative measures of success include the number of patients given NRT and referred to the quitline; number of patients reached by the quitline, and use of NRT and change in tobacco use assessed at one month follow-up. Qualitative measures of success include patients' acceptance of NRT and reports of discussions about smoking cessation.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Initial enrollment included 55 participants who all received NRT. The average number of cigarettes smoked per day was 14.5. Nine individuals (16 %) used e-cigarettes in the past 30 days, 3 (6 %) smoked hookah in the past 30 days, and 6 (11 %) used other forms of tobacco in the past 30 days. Forty-eight (87 %) previously attempted to quit smoking. We reached 30 participants to conduct a 1-month follow-up survey. Twenty-one (72 %) used the NRT patch from OTP, and the patch was used for an average of 11 days (range 0–28). Ten patients reported problems associated with NRT use: inadequate dose and ongoing cravings (2), difficulty finding sites to apply (1), sweating and difficulty sticking on (1), and the remainder with nausea, palpitations, and pruritus. Four patients used other quit-smoking medications during this time (2 NRT gum, 2 unknown medication). At follow-up, patients reported smoking an average of 7 cigarettes per day (range 0–20), and a majority (72 %) reported a change in their smoking pattern since they received the NRT. Many had discussed quitting smoking in the past month: 52 % talked to their OTP counselor; 56 % talked to family or loved ones; 44 % talked to other OTP patients; and 33 % talked to the OTP physician or another health-care professional. Fifteen (56 %) reported they had received a call from the NYS Quitline, and 6 actually had a conversation with a quitline coach. Patients were generally supportive of the program, and offered suggestions for other ways the OTP could promote smoking cessation. These ideas included incentives for quitting (e.g. movie tickets, gift certificates), on-site tobacco cessation support groups, and help with insurance issues for cessation medications. We received follow-up reports for 42 patients from the NYS Quitline. Twelve patients were successfully contacted by the Quitline; of these, 10 had quit smoking, 1 was sent additional NRT by the quitline, and 1 was not ready to quit.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Patients enrolled in opioid treatment programs have high rates of tobacco use and are interested in quitting smoking. Distribution of NRT on-site seems to correlate with a reduction in cigarette use over a short-term time interval and was an effective means of engaging patients to work on improving this health behavior. Connecting patients with the state quitline is useful for the relatively small number of patients who are successfully reached; perhaps a better counseling strategy is to build tobacco treatment into already-existing counseling services and use the energy of the group milieu of the treatment program.

ENHANCING PATIENT ENGAGEMENT AND PROVIDER AWARENESS OF SAFETY VULNERABILITIES USING A MULTIDISCIPLINARY DISCHARGE TIMEOUT CHECKLIST Brian Eiss¹; Paul Martin¹; Laura F. Gingras¹; Julius Motal²; Michael Gao¹; Nadine Rosenthal²; Megan E. Maikoff². ¹Weill Cornell Medical College/ New York Presbyterian Hospital, New York, NY; ²New York Presbyterian Hospital, New York, NY. (Tracking ID #2199313)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Transitioning a patient from acute hospitalization to home is a complex process with varying levels of patient engagement and high rates of adverse events; we believe that a discharge "timeout" checklist that actively engages patients, posed by physicians and nurses after standard discharge instructions, would decrease medication reconciliation errors, improve patient satisfaction and improve provider recognition of potential transitional care associated safety vulnerabilities.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): – To improve patient engagement in and satisfaction with communication efforts from medical and nursing staff at the time of discharge, as reflected by a 50 % improvement in corresponding HCAHPS scores and by self-reported patient satisfaction—To increase self-reported medical and nursing staff awareness of crucial vulnerabilities at the time of discharge care transition, including the unintended presence of central lines or catheters and key changes made to patient medication lists during the hospitalization—To improve self-reported physician and nursing satisfaction with communication at the time of discharge

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Over a several month period at our institution, three medicine patients were unintentionally discharged home with central lines in place, highlighting the need for strategies to increase provider awareness of safety vulnerabilities. Within the past year, efforts have already been undertaken by our institution to improve processes surrounding medication reconciliation and patient engagement. After buy-in was secured on multiple levels, from nursing management and hospital administration to medicine housestaff and staff nurses, focus groups were conducted to inform the creation of a 6-item discharge timeout checklist. During an initial pilot phase on a single medicine unit, this discharge timeout checklist is being administered by both staff nurse and resident physician together at the bedside after standard discharge instructions are provided to patients being discharged directly home. Utilizing rapid-cycle methodology, mini-focus groups are being conducted with involved providers to determine whether the checklist or process should be modified and to recognize any other unanticipated issues. During the pilot, feedback is being sought from providers regarding satisfaction with communication during the discharge process. Feedback is also being obtained from patients directly via satisfaction surveys and indirectly through review of unit-based HCAHPS scores. From the initial pilot phase we will move to prove sustainability and generalizability by expanding to include other medicine patient units with a different mix of patients and different provider types (physician assistants, NPs). We will again utilize PDSA rapid cycle innovation to help us adapt the process and will continue all evaluation processes to optimize engagement.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): – Number/types of "Safety Issues" identified by providers and patients (tracked by paper checklists) - Patient satisfaction, self-reported after discharge timeout and via standard post-discharge phone calls - HCAHPS/Press-Ganey scores for questions relating to discharge and follow-up instructions, medication reconciliation and multidisciplinary collaboration - Provider self-reported satisfaction with interdisciplinary communication (from surveys administered at interval focus groups) - Provider self-reported ability to recognize safety vulnerabilities at hospital discharge (pre- vs post-timeout participation, from surveys) - Readmission rates Process: – Percentage of eligible patients who have discharge timeout completed - Time used for timeout (minutes) - Delays in discharge time because of timeout (minutes)

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We have created our checklist and, to date, approximately 20 discharge

timeouts have been conducted. Housestaff and nursing report success with the current process with only minimal logistical difficulties related to arranging a time to meet for conducting the timeout. The first round of interval focus groups revealed high levels of patient engagement with a majority of patients reporting that they saw potential benefit with the timeout checklist ranging from possible prevention of adverse events to improvement in their understanding of their medical conditions, medications and follow up plans. Resident physicians have reported that they are performing more thorough physical exams on the day of discharge than they did previous to exposure to the timeout to ensure that patients are not unintentionally discharged with lines, tubes or catheters that were meant to be discontinued.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): If successful, this project can improve communication and patient engagement in the discharge process and help increase awareness of potential safety issues at the time of discharge, potentially leading to prevention of adverse events. If we can successfully show generalizability and sustainability, the impact could include full integration of the multidisciplinary discharge timeout into standard hospital discharge processes.

ENHANCING VALUE THROUGH STANDARDIZATION OF NON-MEDICATION REFILL MESSAGES IN A LARGE ACADEMIC MEDICINE OUTPATIENT PRACTICE Stacey E. Jolly; Holly M. Moster; Deborah Burton; Giavanna Russo-Alvarez; Andrea L. Sikin. Cleveland Clinic, Cleveland, OH. (*Tracking ID #2181969*)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Considerable amount of time is spent processing outpatient messages, going back and forth with patients and healthcare team members to obtain needed information, and then additional time trying to track a patient down for resolution of their message.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) Add value to patient non-medication refill messaging process through standardization 2) Improve satisfaction with non-medication refill messaging

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Setting: Outpatient clinic with an integrated electronic health record (EHR) and personal health record (PHR) with ongoing value-based care initiatives to create change through rigorous quality improvement projects Intervention: Standardization of non-medication refill patient messaging Significance: Impacts all team members: medical secretaries, medical assistants, nurses, clinical pharmacists, physician assistants, and physicians; refills already standardized Preplanning: Generated potential causes for wasteful time spent processing patient messages and why no standardization existed. Made a decision matrix and asked people to help us identify top root causes. Created a current and future process map of how non-medication refill messages were being handled and the vision of how they could be handled. Development: Categorized non-medication refills into 4 groups: results, forms, medical question/symptom, other. Found existing electronic templates for outpatient calls and modified for our project needs. Determined a minimum amount of information needed for each encounter and then created algorithms to follow depending on the category and circumstance. Through this method it became clear that our triage procedure also needed to be standardized as calls to the doctor's office are first answered by medical secretaries. Thus, we worked closely with our nursing staff to create algorithms for the medical secretaries on when patients should speak with a triage nurse immediately vs. it could be handled by a clinical team member that same or next day. Implementation: Standardization process vetted at respective meetings for all team members. Training manual was created and distributed. Medical secretaries underwent individual training sessions over 1 month via a "go live" format following the new standardization procedure with actual patients.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Evaluation: Mixed methods electronic survey given pre-/post-intervention to health care team members. Additionally, we conducted a pre-intervention and will conduct a post-intervention random chart audit of telephone encounters to determine the non-medication refill message category, number of days to resolve, number of people involved, and total calls.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Pre-Intervention: survey April 2014; 52 % response rate (46/89). Fifty percent were not satisfied with current non-medication refill messaging process. Sixty-four, 43, and 29 % responded that they always or often would have to call back or bounce back a non-refill message for medical symptoms/questions, test results, or forms, respectively because of missing information. Random chart audit of 24 telephone encounters; Categorized: results 34 %, medical questions/symptoms 25 %, forms 25 %, and other 16 %. To resolve it took an average of 3.2 days (range 1-10) and involved >2 people

(range 1-5) and average of 2 calls (range 1-3). Post-Intervention: survey Sept 2014; 49 % response rate (39/80). Seventy-nine percent were satisfied with the new standardization for non-medication refill messaging. Twenty-eight percent, and 15 % responded that they often would have to call back or bounce back a non-refill telephone message for medical symptoms/questions, test results, or forms, respectively because of missing information. Feedback: medical secretaries appreciate the ability to communicate to patients a time-frame of when to expect resolution of their message; nurses appreciate getting complete information and correct numbers to call patients; team members vested increasing use of the PHR to communicate test results and appropriate issues electronically; physicians appreciate more clarity/detail around what patient is asking for or wanting, that many messages can be handled by other team members.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Lessons Learned: Required a committed team and dedicated time for the necessary planning, implementation, and evaluation. Considerable undertaking to create standardization for each of the 4 non-medication refill categories, however, wanted to minimize confusion around when it should or should not be used and so chose to make it a standard for all practice teams. Medical secretaries, a pharmacist, and physicians were on our team and utilized consultants in nursing, information technology, and administration. Imperative to work with EHR personnel early to know what is possible with EHR platform. Crucial to pilot with EHR test patients and slowly roll out through an iterative process; make changes based on feedback as needed. Challenges measurement and what EHR data can be queried automatically vs. manual chart review. This is adaptable to other outpatient primary care sites, especially those that utilize an EHR.

EYES ON THE PRIZE: IMPROVING DIABETIC RETINAL SCREENING AT AN URBAN SAFETY NET HOSPITAL Claire Horton. UCSF/VASFCM, San Francisco, CA. (*Tracking ID #2198040*)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Long wait times lead to low screening rates for diabetic retinopathy in our urban, safety net population.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Diabetic retinopathy is the leading cause of blindness among adults 20-74 in the U.S. Most people with diabetes will develop diabetic retinopathy within 20 years of diabetes diagnosis (90 % of patients with type 1 and 60 % of patients with type 2).^{1,2} With early detection and treatment, the risk of blindness can be reduced by 90 %.³ Unfortunately, screening rates average 50 % nationally. Our screening rates were even lower: only 18 % of patients with diabetes in our two clinics received routine screening. Objectives: To introduce a system of teleretinopathy screening for patients with diabetes at San Francisco General Hospital To facilitate access to teleretinal services by developing a warm handoff system between primary care and ophthalmology To increase diabetic retinopathy screening rates from 18 to 50 % by December 31, 2014 1. Klein et al. The Wisconsin Epidemiologic Study of Diabetic Retinopathy. IX. Four-year incidence and progression of diabetic retinopathy when age at diagnosis is less than 30 years. Arch Ophthalmol 107:237-243, 1989 2. Klein et al. The Wisconsin Epidemiologic Study of Diabetic Retinopathy. III. Prevalence and risk of diabetic retinopathy when age at diagnosis is 30 or more years. Arch Ophthalmol 102:527-532, 1984 3. Garg, S. Diabetic Retinal Screening Update. Clinical Diabetes, vol 27 no 4, 2009

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): San Francisco General (SFGH) is an urban safety net hospital staffed by residents and faculty of the University of San Francisco, California. The overwhelming majority of our patients are poor, uninsured or publically insured, with multiple medical problems and significant psychosocial comorbidities. The Family Health Center and General Medicine Clinic provide full-spectrum primary care to patients in the SFGH system. Our current combine patient population is 18938 primary care patients. Of these, 3216 (17 %) have diabetes. Prior to this intervention, approximately 20 % of our patients received routine retinal screening. Due to low staffing numbers and inadequate resources, wait times for a visit to ophthalmology clinic were 6-12 months. Additionally, the workflow at ophthalmology clinic included full ophthalmologic exams by an ophthalmologist for most referred patients, without the time-saving assistance of technological support. In 2011, we formed a primary care / ophthalmology partnership to address this issue. Teleretinal screening is an innovation that has helped other systems increase screening rates significantly, and we hoped to introduce this system at SFGH. We purchased teleretinal cameras and trained staff on proper use. After introducing the cameras, we found referral rates remained low. A new workflow was developed in which medical assistants assess every patient with diabetes for up-to-date retinal screening and refer patients directly to teleretinal services if screening is due.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/

INTERVENTION): Our primary metric is the rate of diabetic retinal screening in patients with diabetes. Secondary metrics of success include the impact of the warm handoff system on medical assistant and clinic workflows, the acceptability of teleretinal screening for our diabetic patients, and the ease of tracking results of teleretinal screening in our electronic health record.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We have found minimal impact on medical assistant and clinic workflow with the warm handoff system. Our medical assistants have given feedback about the new system at every step of development, which has helped minimize workflow impact. Patients find the new system acceptable and have expressed appreciation for the decrease in wait times to ophthalmology screening. The rate of diabetic retinal screening has risen from 20 to 60 % over the 3 years of program implementation. Tracking results remains a challenging issue. We are currently developing a system by which results are brought forward into a section of the electronic medical record that is routinely used by providers and staff and can serve as a decision support tool to spur referral.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The introduction of teleretinal screening and a warm handoff system can improve rates of screening for diabetic retinopathy in vulnerable populations. This intervention is relatively cheap and easy to implement with existing staff. In overstretched, underresourced settings, technology can reduce wait times and maximize the ability of highly trained specialists to focus on high risk patients rather than routine screening.

GROUP DISCUSSIONS ABOUT FUTURE CARE PLANNING Nathalie Bloch; Alyse C. Krantz; Aftab Iqbal; Abigail Frydryk. Harvard Medical School, Boston, MA. (Tracking ID #2195063)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Will a targeted and tailored approach to end-of-life discussions at the primary care clinic result in higher satisfaction, a greater proportion of participants making end-of-life choices, and higher PAM scores amongst participants as opposed to individuals who did not have such an intervention?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): . Provide a safe space where patients and their loved ones can explore their preferences, values and goals related to end-of-life care . Educate patients about end-of-life care planning and options and empower them to take an active role in their health care . Increase proportion of patients who have a signed health care proxy on file

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): This project, supported by the Harvard Medical School Innovation Fellows Program, explores the capacity of the primary care physician to initiate end-of-life planning among non-terminally ill patients age 65 and older through a structured peer group discussion. We are currently up-scaling our pilot study to involve ~10 primary care physicians. Based on the results of a pilot, we estimate that each PCP will be able to recruit 20 patients. Patients are randomly assigned to control and intervention groups. The intervention includes a structured, peer led end-of-life conversation facilitated by members of the research team, which includes a video, values & satisfaction surveys, conversation regarding advance directive and health care proxy forms.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): This qualitative, comparative experiment uses multiple semi-structured questionnaires in a prospective fashion. The questionnaires include knowledge surveys on end-of-life care and satisfaction surveys for participants and family members. Patient activation and involvement in his/her own care is assessed using a validated questionnaire PAM (Patient Activation Measure). The intervention will be evaluated through a comparison of the proportion of advance directives (health care proxy and DNR/DNI forms) that are submitted by participants in treatment and control groups. Additionally, we try to quantify how many people are "touched" by these discussions, as each participant talks to more people about their experience in the discussion.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Our study included 15 treatment patients, 7 family members, and 11 control patients. We held four group discussions. • 100 % of patients and family members reported feeling comfortable throughout the group discussion ($n=22$) • 73 % of treatment patients showed increased knowledge about end-of-life care planning issues, compared to 27 % of control patients ($n=26$) • The proportion of study patients with a health care proxy on file increased 40 %, compared to a 0 % increase among control patients ($n=26$) • On average, participants reported sharing their discussion experience with four people outside of the study ($n=15$) • 86 % of patients and family members reported that the group discussion helped them recognize values and goals about end-of-life care ($n=22$) • The

PAM scores increased slightly from 68.6 to 69.1 in the treatment group and 63.5 to 66.3 in the control group ($n=26$). The majority of the participants in the treatment and control group entered the study at a PAM level 3 or 4 (93 % of treatment patients and 91 % of control patients)

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our results proved that peer group discussions are an effective method for educating patients about end of life care and planning. We determined that patients felt more comfortable having end of life discussions with their loved ones following the intervention, and that the group discussion allowed them to explore and identify their values around end of life care. Additionally, health care proxy forms submission data suggest that the intervention had a positive impact on patient advance care planning behaviors. Finally, patients in the intervention group were eager to share their experience at the group discussion with members of their social community, leading to a "network effect."

HIGHLAND HEALTH ADVOCATES: A RESIDENT-LED, MULTIDISCIPLINARY ADVOCACY PROGRAM ADDRESSING SOCIAL DETERMINANTS OF HEALTH Michael Wang¹; Dennis Hsieh¹; Deborah Son¹; Lia Losonczy¹; Kimiko Tahara¹; Harrison Alter¹; Blake Gregory². ¹Alameda Health System—Highland Hospital, Oakland, CA; ²Highland General Hospital, San Francisco, CA. (Tracking ID #2194323)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Patients in the safety net struggle with barriers such as food insecurity and unstable housing that may undermine health and wellbeing.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Collect data on patients' social needs to better allocate hospital resources. 2. Assess impact of intervention on healthcare utilization metrics including hospital admissions, clinic no-show rates, establishment of patient centered medical home, and emergency room visits

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Social determinants of health are an increasingly recognized target for improvement in healthcare and have been associated with premature mortality (Cheng, et al.), among other unfavorable outcomes. This is especially true at safety net hospitals like Highland General Hospital (HGH) in Oakland, California. At HGH, we created an outpatient, resident-led low acuity social work service to serve the needs of clients who are at risk of food insecurity, unstable housing, legal problems, and other issues that impact wellbeing. This program, Highland Health Advocates (HHA), connects clients to available resources depending on the specific needs of the patient. HHA staffs numerous service desks located in the Emergency Department waiting room and near multiple outpatient clinics. The desks are open 9 AM to 5 PM Monday through Friday and accept both patient self-referral and HGH provider referrals by phone or in-person. The service desks have been staffed by 75 volunteers recruited from both nearby colleges and the community at large. One hundred twelve volunteers will be active starting January 2015. They are organized into ten four-hour shifts per week and managed by specially trained volunteer leads, who are in turn supervised and led by a full-time social worker. Our program uses a resident-built Microsoft Access database for client management and a Google Drive datasheet as a resource database.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our program evaluates process measures including number of client referrals, percentage of patients satisfactorily helped, patient demographics, and need assessments. Hospital utilization metrics as described in the objectives will also be incorporated into the evaluation of program effectiveness.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Since formalized data collection started June 20, 2014 through December 31, 2014, we have served 571 clients. Of these clients, 166 reached an endpoint of being discharged from the program for having needs met, not desiring further resources, or being lost to follow-up. Among this cohort of discharged clients, 44 % (73) had needs satisfactorily met or required no further assistance. The remaining 405 clients continue to be actively enrolled in the program. Among all clients, the top need was housing, affecting 52 % of clients served. Food insecurity was the next highest ranking need, affecting 21 % of clients. Initial comparison of discharged clients who had needs met versus clients who were lost to follow-up showed no significant differences in gender or average age. There was a trend towards more Spanish speaking clients in the group of clients who had problems addressed (16 % vs 8 %), but this difference was not significant.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our preliminary data described above have already begun to inform policy change at our institution. The recognition of food and housing as top priorities in the clients we serve has

led to outreach and partnership with food resources and homeless advocacy groups. Meanwhile, further characterization of the types of clients we are able to help will identify opportunities to improve and expand upon our current service offerings. This project continues to be in the early stages of its validation and development. However, it has already been a great benefit to our clients and has been instrumental in matching institutional resources to the needs of clients with significant barriers to achieving health and wellbeing. As such, we plan to publish a toolkit as a resource for other institutions to replicate. Critical components to success include a core of dedicated volunteers, full-time social work staff for managing volunteers, executive level institutional support, integration within existing social service offerings, active clinical champions, and flexible information systems that adapt to changing program needs. Properly staffed and equipped, an advocacy program based on our model should be replicable at any institution with a high social need burden and can have the capacity to make an immediate impact on policy decisions to improve patient care.

IMPLEMENTATION OF A MEDICATION MANAGEMENT PLAN FOR PATIENTS DISCHARGED TO SKILLED NURSING FACILITIES

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Hospitals often send multiple medication lists for patients transferred to skilled nursing facilities (SNFs), which can contribute to medication errors and often lack guidance for prospectively managing medications at SNF.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To implement a medication management plan which consolidates medication information and provides prospective guidance for patients being transferred from hospital to SNFs.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Vanderbilt University Hospital (VUH) is a private, non-profit, quaternary care teaching institution located in Nashville, Tennessee. Funded by a CMS Innovations award, VUH has implemented IMPACT (Improved Post-Acute Care Transitions). IMPACT is a quality improvement intervention for Medicare patients who are transferring to 23 SNFs in middle Tennessee and southern Kentucky for post-acute care services. IMPACT focuses on improving communication of the patient's care plan between the family, the acute care setting, and the SNF. A key component of the intervention is transfer-oriented medication reconciliation and documentation by a clinical pharmacist. Pharmacists reconcile prehospital medications with the transfer orders and clearly mark which are to be continued, changed, held, or discontinued on the Medication Management Plan. The plan also includes the indications, comments for prospective management, and the last administration date/time. Documentation of selected high-risk medications, such as warfarin, insulin and diuretics, includes recent doses and relevant clinical data. The pharmacist reviews the plan for potentially inappropriate medications (PIMs), and, if necessary, contacts the discharging team about clinically relevant medication errors and recommends changes prior to the plan being sent with the patient to SNF.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Pharmacists record medications and PIMs throughout hospitalization, as well as clinically relevant medications errors identified, communicated and resolved prior to SNF transfer.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Preliminary data from January 2013 to July 2014 on 564 patients transferred to SNFs with a medication management plan demonstrates that on average patients took 12.8 medications on admission and 14.2 on discharge. Patients were prescribed on average 2.4 PIMs on admission, 1.2 initiated during hospitalization, and 2.3 at discharge. On average 1.0±1.3 PIMs were stopped or held at discharge per patient. Pharmacists identified an average of 1.5 clinically relevant medication errors per patient, communicated them to the discharging team, and were able to resolve an average of 0.6 errors prior to transfer.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Implementation of the medication management plan has improved the quality of documentation of patient's medications prior to SNF transfer. Future work will be to integrate the medication management plan into the electronic medical record, so it will be sent

automatically to the SNF for this patient population. An important lesson learned is that despite implementing the medication management plan containing anticipatory guidance, there was no decrease in the number of total medications or PIMs prescribed at transfer to SNF. While this intervention is important, it is not enough to simply reconcile medications without trying to discontinue more of those that are problematic or perhaps reducing polypharmacy altogether. Subsequent interventions will target reducing overall medications and PIMs in order to further reduce the risk of medication errors for patients transferring to SNFs.

IMPLEMENTATION OF AN ELECTRONIC REFERRAL SYSTEM IN A LARGE ACADEMIC MEDICAL CENTER Michael Barnett^{1, 3}; Ateev Mehrotra³; Joseph P. Frolkis¹; Melissa Spinks²; Brandon Hehir²; Casey Steiger²; Jeffrey Greenberg². ¹Brigham and Women's Hospital, Brookline, MA; ²Brigham and Women's Physicians Organization, Boston, MA; ³Harvard Medical School, Boston, MA. (Tracking ID #2193544)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): There are many well-documented problems with the specialty referral process and at our institution, Brigham and Women's Hospital (BWH), prior work showed that 63 % of PCPs were dissatisfied with the referral process and making significant number of referrals outside of our system.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To improve the referral process we set out to design and implement an electronic specialty referral ordering system ("eReferral") to 1) increase PCP satisfaction with the referral process, 2) improve referral tracking and enable effective triage of urgent referrals, and 3) reduce referrals to specialists outside of the BWH system.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): This innovation was implemented at BWH, an academic medical center with ~135,000 primary care patients seen by 162 PCPs at 14 clinics. In 2013 there were approximately 105,000 new specialist visits at BWH, with about 32,000 of those from this primary care population. The new eReferral system was integrated within the EMR for point of care referral ordering. To make a referral, the referring physician enters the following in a screen accessible through the patient's chart: desired specialty, specific physician vs first available specialist, brief reason for referral, and urgency level (<3 days, <7 days, <30 days, or patient convenience). The referral is then sent to an electronic queue managed by the specialty department's administrative staff, who calls the patient within one business day to book an appointment. This step bypasses the need for the primary care office to serve as an intermediary in the process of scheduling a referral. The eReferral program was rolled out in January 2014 to all primary care sites.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We conducted a prospective cohort study of all BWH PCPs and primary care population. We measured physician outcomes using electronic surveys pre- and post-intervention (satisfaction with process and perceptions on access, 65 and 63 % response rate in pre and post surveys, respectively) and patient outcomes using internal billing and scheduling data (specialty visit volume, time to appointment and percentage of specialist referrals outside BWH).

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The eReferral process was rapidly adopted by BWH PCPs: by August 2014, 93 % of all new specialist referrals from BWH PCPs were made via eReferral. The percentage of PCPs agreeing or strongly agreeing that they were satisfied with the overall referral process increased from 21 to 69 % ($p<0.001$). The fraction of PCPs agreeing or strongly agreeing that they could confidently track referrals increased from 20 to 45 % ($p<0.001$). PCPs reported increased ability to obtain timely access to ten common specialties with 5 of those increases statistically significant ($p<0.05$). The distribution of triage urgency requests through eReferral was heavily skewed towards non-urgent referrals, with only 19 % of the requests for an appointment within one week or less. After eReferral implementation the fraction of first appointments that occurred within 7 days or less decreased from 26 to 24 % ($p=0.003$), while first appointments occurring 31 days or more from the date of referral increased modestly from 33 to 34 % after eReferral ($p=0.07$). The average number of monthly new specialist visits per BWH primary care patient increased from 2.25 to 2.75 new specialist visits per 100 patients per month ($p<0.001$). There was a non-statistically significant decrease in percentage of specialist referrals outside of BWH from 28 to 23 % ($p=0.054$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The implementation of the eReferral system at BWH was a success with several key caveats. PCP satisfaction with the referral process and referral tracking increased dramatically.

PCPs also reported improved access to across several departments in specialty care. In addition, we observed a notable decrease in percentage of specialist referrals outside of BWH. However, despite PCP perceptions, we observed little change in actual access times, which could reflect better “sorting” of patients into nonurgent referrals with longer waiting periods. We also found an increase in the number of specialist visits per month in the BWH primary care population, which could mitigate the benefit of eReferral in a health system trying to minimize unnecessary referrals. This growth likely reflects the greater ease and transparency of the new referral system which creates less of a barrier to referral than the prior system. Further study of eReferral across a wider diversity of health systems will help to quantify the impact of such systems on the specialty referral process.

IMPLEMENTATION OF TEAM-BASED CARE FOR DIABETES FOR SAFETY-NET POPULATION WITH COMPLEX MEDICAL AND PSYCHOSOCIAL COMORBIDITIES

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Diabetes prevalence is disproportionately high among patients treated in safety-net settings, and with Medicaid expansion under national health care reform, there is a critical need to develop interventions to improve medical outcomes in these high-risk, vulnerable populations.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Describe the feasibility and acceptability of adapting and implementing an evidence-based multi-condition collaborative care intervention for the treatment of diabetes and cardiovascular risk factors in an academic primary care clinic serving a safety-net population. 2. To identify patient characteristics (demographics, medical and psychosocial) associated with “engagement” in the Diabetes Treatment Team, by comparison of patients who were referred but did not establish with the program, to those who attended more than two visits and were not lost to follow up.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): TEAMcare is an evidence-based multi-condition collaborative care model that was shown to improve diabetes disease control and depression symptom severity among primary care patients in a randomized controlled trial in a large health maintenance organization (Katon, N Engl J Med. 2010 Dec 30;363(27):2611–20). We describe the implementation of the TEAMcare model in an urban safety net primary care clinic in Seattle for a target population with high rates of serious mental illness, substance abuse and dependence, and social vulnerabilities. There was no external funding to support this implementation, and all services were provided utilizing existing resources. Harborview Medical Center (HMC) in Seattle, WA is a safety-net teaching hospital, and provides over 45 % of all charity hospital care delivered in King County, WA. The Adult Medicine Clinic is HMC’s largest primary care clinic serving roughly 4500 patients; approximately 1000 of patients have diabetes, with 30 % having poor glycemic control (HbA1c > 9 %). All clinic patients with HbA1c > 9 % were eligible to enter into the Diabetes Team program, there were no exclusion criteria. Referrals came from primary care providers. The program consisted of the following components: 1) an individualized health plan with specific and measurable targets; 2) frequent contact with care manager for support of diabetes self-care; 3) treat-to-target pharmacotherapy intensification; 4) weekly team-based systematic case review using a registry of enrolled patients (Chwastiak, Int Rev Psychiatry. 2014 Dec;26(6):638–47). Our multi-disciplinary team includes 4 diabetes care managers (an advanced nurse practitioner, 2 RNs and a nutritionist/certified diabetes educator), a medical assistant, a social worker and a consulting psychiatrist and internist.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Diabetes disease control was measured with respect to Hemoglobin A1c, systolic blood pressure and LDL. Depression symptoms were evaluated with PHQ-9. Alcohol use and substance use disorders were identified through chart review. Engagement was defined as attendance at two or more care manager visits. Descriptive statistics were used to evaluate demographic and clinical characteristics of all patients referred to our Diabetes Team, and for those patients who engaged in treatment and those who did not.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Since March 2013, 156 patients have been referred to our clinic Diabetes Team, 68 have attended two or more visits, while 88 did not engage or were lost to follow up. Patients who engaged with the Diabetes Team were similar to those who did not in terms of: age (mean 57.5 years for those who engaged, 53.3 years for non-engaged); ethnicity (white 38.2 % compared to 35.2 %, black 26.5 to 34.1 %, hispanic 22.1 to 18.2,

API 7.4 to 10.2 %, and American Indian 4.4 to 1.1 %). Mental health disorders were common, and similar between those who engaged and those who did not: depression (45.6 % engaged compared to 47.7 % non-engaged); post traumatic stress disorder (5.9 to 13.6 %); bipolar disorder (0 to 6.8 %); psychotic disorder (5.9 to 1.1 %); and other psychiatric diagnosis (15.1 to 14.8 %). Patients with substance abuse diagnoses were less likely to engage with the Diabetes Team: alcohol abuse (7.6 % for those who engaged compared to 18.2 % for those who did not); opiate use (4.5 to 15.9 %); methadone use (1.5 to 4.5 %); cocaine and/or methamphetamine use (1.5 to 9.1 %); and marijuana use (7.6 to 15.9 %). Similarly only 4.5 % of engaged patients were documented to be homeless, compared to 11.4 % of those who did not engage.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

It is feasible to implement an evidence-based multi-condition collaborative care in an academic teaching clinic serving populations with significant psychosocial vulnerabilities, without external funding. Given the limited resources in safety net settings, the current pilot provides critical information to identify patients who are most likely to engage in and benefit from this resource-intensive intervention. Next steps include evaluation of preliminary effectiveness.

IMPLEMENTING ROUTINE INTER-PARTNER VIOLENCE SCREENING AT LGBT HEALTH CENTER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Domestic violence or inter-partner violence (IPV) is a significant social and health concern, resulting in 5.8 billion dollars in medical costs annually. The U.S. Preventive Services Task Force recommends IPV screening for women of childbearing age, and screening interventions tested among women show that those who talk to their health provider about partner violence are four times more likely to use an intervention. Research shows that lesbian, gay, bisexual and transgender (LGBT) people experience IPV at rates similar to or higher than heterosexual women; therefore, some have also recommended routine screening in these communities. Despite these recommendations, rates of IPV screening remain low nationwide. At our own health center, pre-intervention data collected prior to implementation of the universal screening protocol described below demonstrated a screening rate of approximately 30 % in women ages 18–50 who had been prescribed birth control in the previous 3 years, with 6 % of those screened reporting past or current abuse. Although we did not ascertain baseline screening rates among older females, males, or transgender individuals specifically, we suspect that we would have observed even lower pre-intervention screening rates in these groups.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The goal of this intervention was to institute universal IPV screening in order to identify all patients in need of support and to facilitate connection to violence recovery and prevention services. A systems-based screening strategy was created that included 1) development and administration of a gender-neutral screening survey; 2) implementation of electronic health record (EHR) reminders and forms to promote effective documentation/tracking; and 3) construction of a referral network.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Fenway Health, a community health center specializing in LGBT health, provides an ideal venue in which to study the feasibility and effectiveness of IPV screening across all genders and sexual orientations. All patients presenting for primary care appointments are considered eligible for screening. Universal screening was implemented in February 2014. The screening survey is administered via tablet or paper version to any patient who has not been previously screened within the last 12 months. Screening is prompted by an EHR alert that reminds the medical assistant to offer the screener to each eligible patient. A provider then reviews survey results with the patient during the visit and documents responses on an electronically extractable tracking form. Patients who screen positive are offered a referral to Fenway’s on-site Violence Recovery Program for LGBT-identified patients, an on-site behavioral health specialist, or to apropos support services in the community.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Following implementation of universal IPV screening, we have assessed screening effectiveness quarterly by measuring rates of overall screening, disclosure, and referral uptake via the electronic health record.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The first two quarters of screening from February to August 2014 estimated an overall screening rate of 52 % across primary care appointment types, with 10 % of patients disclosing emotional, physical, or sexual abuse within the past year. Fifty

percent of patients who were offered a referral to an in-house violence recovery program were seen within 6 months of screening, suggesting that use of this screener and immediate referral may help clients connect to needed services. Demographic data suggest that this screening is effective in reaching groups who are underserved by traditional violence recovery programs, including men and LGBT-identified people. In terms of gender, approximately 56 % of those who disclosed current violence were male, 27 % female, and 17 % transgender. In terms of sexual orientation, 32 % of those reporting current violence identified as lesbian or gay, 11 % as bisexual, and 23 % as heterosexual. Approximately 6000 patients were screened in the first 6 months of implementation.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Initial findings indicate that EHR prompts and paper-based surveys result in higher rates of IPV screening and detection. Gender-neutral screening that is appropriate for people of all genders and sexual orientations may play an important role in reducing health equity gaps for LGBT communities. Fenway's universal IPV screening strategy may inform screening practices in other primary care settings.

IMPROVING A HEALTH CARE SYSTEM'S CRITICAL LAB VALUE REPORTING PROCESS THROUGH A MULTI-DISCIPLINARY QUALITY TEAM David McCollum; Daran Brown; Joshua Gunnin; Vicki Hale; Trevor Lever; Leslie Hayes. University of Alabama at Birmingham, Birmingham, AL. (*Tracking ID #2195788*)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A University Hospital System's special process which alerts clinicians of critical lab values has become unwieldy and dysfunctional.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): -Review the medical literature, nationwide best practices, and regulations related to the reporting of critical lab values -Make recommendations to hospital administration for improvements in our institution's process of reporting of critical lab values -Implement the changes and track associated metrics including cost-savings

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): This quality improvement project took place in a large urban University Hospital System that includes both inpatient and outpatient settings. The community served by this hospital includes the mid-sized city where it is located and serves as a referral center for the region. Patient safety cases involving critical lab values were reported to the hospital's patient safety committee. The patient safety committee identified the critical lab value notification special process to be in need of improvement. A multi-disciplinary quality improvement team was formed out of members taking part in the University Hospital's onsite quality improvement academy. The team was made up of an internal medicine physician, two nurse managers of hospital wards, a nurse member of the patient safety committee, a pediatric critical care physician, and the manager of the hospital's paging network. The team made a process map of the critical lab value notification special process. The team collected available hospital data related to the process. The team discussed the process with the key frontline staff involved in the process. The lab manager responsible for the process identified the following issues: "too many critical lab tests, poor documentation, and lack of reviews of critical lab policies." Review of data showed that there were 47 different laboratory tests with over 6000 results per month that were required to undergo the special process. Interview of key frontline clinical laboratory staff and clinicians discovered the sense that many of the labs being reported were not in fact critical. They were not felt "critical" because they did not require urgent action and could be dealt with using routine clinical processes. These interviews also raised the concern for "alarm fatigue" in which the vast number of critical lab values might dilute the response to those lab values which truly did require urgent action. Review of the literature and other institutions critical lab value notification systems discovered much variability and no gold standard in regards to which labs and parameters were considered critical. Review of regulations by The Joint Commission revealed a requirement for a critical lab value reporting process but that the values included were up to the institution. The team next gathered a multi-specialty committee of ten physicians known for their clinical expertise and leadership within the institution. The committee reviewed the findings of the quality improvement team and then discussed each critical lab value and made recommendations for a modified list. The modified list was then presented to the hospital administration's operational effectiveness committee. The committee approved the changes (with one exception) and formed a task force to implement the change. Currently the modified critical lab value list is being coded into the electronic health system. The change will be fully implemented in 1 to 2 months.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Quantitative Measures -A decreased number of labs-per-month requiring use of the critical lab value special process -Less time spent by laboratory staff

finding and alerting clinicians of critical lab values Qualitative ->With the decrease in required calls, the critical lab value process will become a more functional patient safety process -Frontline participants in critical lab value special process (lab techs and nurses) will have less distraction and be better able to perform their core duties

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): -The changes to the critical lab value list includes removing 18 labs of the original 47, and hence the new list will include 29 labs -Of the 29 remaining labs on the list, 9 labs had the parameters changed which require activation of the critical lab value process -The projected change will be a 52 % decrease in number of labs requiring the special process -Projected savings of laboratory technician time will be 1.8 FTE's -Feedback from the lab director was very encouraging including "The work the team did was simply amazing!"

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): -A critical lab value reporting system requiring too many notifications can lead to the process becoming dysfunctional and becoming a patient safety hazard -A multi-disciplinary quality improvement team is an effective approach to this problem -An internal medicine physician's clinical expertise and professional relationships is an invaluable asset to the team.

IMPROVING CLINIC FLOW IN AN ACADEMIC GENERAL INTERNAL MEDICINE CLINIC UTILIZING PATIENT-CENTERED LAYOUT AND SIGNAGE Brooke B. McGuirt; Betsy B. Shilliday; Tamrah Parker; Derek Cain; Shana Ratner. University of North Carolina at Chapel Hill, Chapel Hill, NC. (*Tracking ID #2198593*)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): The University of North Carolina (UNC) Internal Medicine Clinic (IMC) Press Ganey scores showed patient dissatisfaction with moving through the visit, and employees were stopped over 380 times a day by unnecessary interruptions related to patient flow.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) To improve patient satisfaction in moving through the visit 2) To identify areas in clinic where signage was lacking or needed to be improved 3) To reduce staff interruptions by improving IMC signage to allow patients to more easily self-navigate through the clinic

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The UNC IMC is an academic general internal medicine clinic with 13,958 active patients and approximately 44,000 visits per year. It is recognized as a Level 3 Patient Centered Medical Home. The clinic has a newly formed patient advisory committee and is working to solicit more patient feedback in its longstanding quality improvement work. The clinic is staffed by faculty physicians, resident physicians, and advanced practice providers. The nurses are predominantly LPNs. With over 200 patient visits a day, clinic staff reported frequent interruptions by patients requiring assistance navigating through the clinic. IMC formed a multidisciplinary Lean Six Sigma purple belt team to conduct a week-long Kaizen event to investigate patient flow problems of the clinic and test solutions. Administrative and nursing staff completed brainstormed patient flow problems. The team worked with the staff to complete a root cause analysis to determine the deeper causes of reported problems. Patients external to the clinic (from the cancer patient advisory board) walked through the clinic and gave feedback about patient flow and signage. The team compiled this information and broke the root causes into: confusion caused by the 2 desk check-in system, lack of signage to checkout, poor signage for check-in, and lack of 3D signs to the restrooms. The team created temporary paper signage and directly observed front desk and internal clinic flow, shifting placement, style and size of the signs based on staff and patient feedback. We tested several methods to direct patients to the correct check-in desk and to the correct provider room during the visit. Once new temporary signs were in place, we checked for clarity by walking the route to and from every room in the clinic. In doing so, we recognized and changed signs that were still not clear. Patient advisors were brought back to tour the clinic once signs were tested during the week to ensure patient satisfaction before finalizing the new signage order.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our team conducted observations of patients and staff before, during, and after implementation of the new signs. Observers were dispersed throughout the clinic to be able to watch every area for 1 h at a time. They tallied interruptions during that time and categorized the types of interruptions. Hourly interruptions were multiplied by 8 to approximate the number of interruptions per day. Counts were collected for the number of times patients inquired about the exit, the restroom, the number of patients checking in at the wrong desk, and the number of wandering patients and families. These interruptions were classified as either being a nurse or front desk interruption. We also noted our Press Ganey scores relating to moving through the visit being before and after

the changes. Finally, our team tracked the number of new signs added to the clinic, signs removed, and patient safety issues that were identified and resolved throughout the process.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): By improving IMC signage, our team was able to reduce total interruptions per day by 60 % (384 to 152), nurse interruptions by 40 % (160 to 96), and front desk interruptions by 75 % (224 to 49). The team was able to add 39 news signs to our clinic and eliminate 12 signs that were misdirecting patients or causing inefficient patient flow. Press Ganey scores related to moving through the visit improved from satisfaction levels of 84.7 % before to 92.9 % after our intervention. Staff were surveyed and were highly satisfied with the improved flow. Throughout the process we identified and resolved 4 patient safety issues. The small tests of change with the temporary signs led to multiple changes in the placement and content of signage during the kaizen week. Data from this project led to a switch to a 1-desk from a 2-desk check-in model.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): By gathering patient and staff feedback and performing a root cause analysis, our team was able to improve signage, improve patient flow, and reduce non-value added interruptions in IMC. Utilizing the patients' perspectives we were able to fix the signage to better meet their needs. Staff satisfaction improved by decreasing unnecessary interruptions leaving them more time for clinical care. Using rapid cycle improvement and testing different front desk layouts and temporary signs, the team was able to provide data to support development of more patient-centered and staff friendly flow for the clinic.

IMPROVING CMS QUALITY METRICS: INNOVATION THROUGH A TEAM-BASED APPROACH Janet R. Zolli²; Huy Hoang²; JoAnne Gottridge¹; Maansi D. Amin²; Joseph Conigliaro². ¹Hofstra North Shore LIJ School of Medicine, Great Neck, NY; ²Hofstra-NS/LIJ School of Medicine, North Shore University Hospital, Great Neck, NY. (Tracking ID #2198017)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): With quality metrics becoming the standard measure for quality of care and the measure for reimbursement, it has been a challenge for physicians to improve quality metrics on their own.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): We undertook a quality improvement project that involved all members of the practice including medical assistants, IT technicians, data analysts and physicians in a large, suburban outpatient practice which included a resident-run practice. The objective of the project was to improve quality metrics such as mammogram screening, colorectal screening, diabetes management, pneumococcal vaccination, and smoking cessation counseling.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Starting in 2011, we began to use a team-based approach to improve quality metrics in a faculty and resident-run, suburban outpatient practice. This approach included the following changes: 1. Medical assistants, nurses, and physicians participated in daily huddles to help identify patients who needed to be screened or counseled for that day. 2. Standing protocols were made for ordering the FIT colorectal screening test and pneumonia vaccine so that physicians would not have to be reminded to order the test or vaccination. 3. Data analysts drew up reports for eligible patients who had not been screened for mammogram, colorectal cancer, and the pneumonia vaccine. 4. Reminders were sent to patients so that they could discuss screening with physicians. 5. Vaccinations and the results of screening tests were electronically uploaded so that they could be easily tracked. 6. Rates for each physician were posted and shared to other physicians to develop a friendly, but competitive atmosphere for improving quality metrics. 7. Quality measures were assessed on a monthly and yearly basis. The Plan-Do-Study-Act cycle was used to help develop and test changes to protocols to improve quality measures.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The quality measures for mammogram screening, colorectal screening, diabetes management, pneumococcal vaccination, and smoking cessation counseling are measured on a monthly and yearly basis. The quality measures are compared from year to year to measure success of the team-based approach.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Over the 3 years since initiation of the program, quality metrics in mammogram screening, smoking cessation counseling, colorectal screening, diabetes management, and pneumococcal vaccine have improved year over year, and in most cases have exceeded goals. Baseline data was established in 2011. For mammogram screening, the rates of screening have improved from 45.0 % in 2011 to 64.4 % in 2012 to

77.8 % in 2013 to 82.5 % in 2014. The rates of colorectal screening improved from 45.5 % in 2011 to 47.3 % in 2012 to 50.4 % in 2013 to 57.6 % in 2014. For the resident practice, colorectal screening rates improved from 24.2 % in 2012, to 28.5 % in 2013, to 43.5 % in 2014. The rates for the pneumonia vaccine were 82.0 % in 2011, 90.3 % in 2012, 84.3 % in 2013, and 85.8 % in 2014. The rates of people with diabetes with A1Cs of more than 9 % was 24.0 % in 2011, 14.8 % in 2012, 14.2 % in 2013, and 14.5 % in 2014. The patients who received smoking cessation counseling improved from 50.0 % in 2011 to 52.0 % in 2012 to 69.0 % in 2013 to 88.5 % in 2014. Overall, there was a significant improvement in all quality measures using the steps outlined above. The effectiveness of the team-based approach is most apparent when comparing year to year quality measures for colorectal screening in the resident practice. Because of the financial cost of colorectal screening and patients in the resident practice comprising of uninsured populations, colorectal screening rates were 24.2 % in 2012. Using the PDSA cycle, cost as a major barrier to colorectal screening was identified. The FIT test was identified as a low cost alternative. Data analysis was used to identify and remind physicians of patients that required colorectal screening. This led to an improvement of screening rates to 28.5 % in 2013. In 2014, using standing protocols, medical assistants started handing out FIT tests to patients at the beginning of a well visit. This gave both the medical assistant and the physician an opportunity to discuss the importance of colorectal screening. This led to an increase in colorectal screening rates in the resident practice from 28.5 % in 2013 to 43.5 % in 2014. This significant increase most clearly outlines the effectiveness of the team-based approach.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The team-based approach involving all members of a practice can improve quality measures. By working with data analysts, IT technicians, medical assistants, and nurses, barriers to improving patient care can be addressed and overcome. Using daily huddles with all members of the healthcare team, having medical assistants hand out screening materials and tests, having all screening and tests results in an easily trackable EMR, and having friendly competition among colleagues can all help to improve quality measures. These methods can be adapted and applied to outpatient clinical practices to improve patient quality measures and outcomes.

IMPROVING DEPRESSION ASSESSMENTS AND TREATMENT IN A HOSPITAL FOLLOW-UP CLINIC TO DECREASE READMISSIONS Genevieve G. Embree²; Jamie Cavanaugh⁴; Brooke B. McGuire²; Shana Ratner¹. ¹UNC Chapel Hill, Chapel Hill, NC; ²UNC Health Care, Chapel Hill, NC; ³UNC Internal Medicine, Chapel Hill, NC; ⁴University of North Carolina at Chapel Hill, Chapel Hill, NC. (Tracking ID #2196389)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Readmitted patients at the University of North Carolina (UNC) Internal Medicine Clinic (IMC) had high rates of depression, and lack of treatment at the time of discharge may contribute to their readmissions.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Improve recognition of depression in recently discharged patients using the 9-item Patient Health Questionnaire (PHQ9). 2. Provide interventions (anti-depressant medication, counseling, or Psychiatry referral) to those with moderate to severe depression utilizing standard protocols. 3. Decrease hospital readmission rates by treating a common driver of readmission.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The University of North Carolina Internal Medicine Clinic is an outpatient academic general Internal Medicine practice serving about 13,000 patients. In 2012, the clinic designed an innovative multi-disciplinary dedicated hospital follow-up clinic to specifically meet the needs of patients transitioning out of the hospital with the goal of preventing readmission. The dedicated clinic is staffed by a clinical pharmacist, care manager, and physicians. We provide 108 hospital follow-up appointments monthly. Previous root cause analyses of readmitted patients from our clinic noted high rates of depression in these patients. As a result, in July 2013 we began administering the 9-item Patient Health Questionnaire (PHQ9) to screen for and assess severity of depression among all patients seen in the hospital follow-up clinic. For patients with moderate to severe depression (PHQ9 score ≥ 10), we offered interventions including medications, referral for counseling, and/or Psychiatry referral based on standard protocols. An embedded social worker provided most of the counseling for these patients. Patients then followed up and received usual care from their primary providers including ongoing depression treatment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our primary measure was presence of absence of depression assessment with PHQ9. Secondary measures included depression severity, presence of

evidence based treatments, and presence or absence of 30-day hospital readmission. We determined the percentage of patients with moderate to severe depression by PHQ9 score at hospital follow-up visit who received a subsequent PHQ9 assessment once they returned to usual care. Based on these paired data, we calculated whether depression assessment is associated with improvement in depression severity. We will also calculate correlation coefficients to see whether absolute PHQ9 score and/or change in PHQ9 score are associated with readmission risk.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Of 545 patients seen in our hospital follow-up clinic between July 1, 2013 and April 3, 2014, we successfully screened 325 patients (60 %). Mean PHQ9 score was 7.0 with a standard deviation of 5.8. The breakdown of depression severity was as follows: 136 (42 %) had no depression (PHQ9 score 0–4); 87 (27 %) had mild depression (PHQ9 score 5–9); 59 (18 %) had moderate depression (PHQ score 10–14); and 43 (13 %) had severe depression (PHQ9 score ≥ 15). Based on a chart review of 160 patients, among those with moderate or severe depression, 22 % were offered medication, 22 % were offered counseling, none were offered new Psychiatry referrals (many were already followed by Psychiatry), 30 % were recommended to continue or restart their previously recommended therapy, and 39 % did not have treatment recommendations documented. Based on a chart review of the first 47 patients with moderate to severe depression, 29 (62 %) had documented subsequent PHQ9 scores after returning to usual care. Paired *t*-test calculations for those with documented subsequent PHQ9 scores revealed a clinically and statistically significant decrease in PHQ9 score. Those with PHQ9 score ≥ 10 (combined moderate and severe depression) had an average decrease of 5.1 points at the subsequent encounter ($p < 0.0001$). The effect was strongest among those with severe depression (PHQ9 ≥ 15) who had an average 6.1 point drop in PHQ9 at the subsequent encounter ($p = 0.01$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Depression has been documented as a risk factor for hospital readmissions and seems a fruitful target to reduce readmission rates. We have been able to demonstrate improvement in depression severity among recently hospitalized patients by incorporating depression assessment with PHQ9 and offering standard depression treatments which could be replicable in other clinics. We are hopeful that the improvement in depression severity will lead to reduced hospital readmission rates.

IMPROVING IDENTIFICATION OF HIGH-RISK PRIMARY CARE PATIENTS FOR INTERNAL MEDICINE RESIDENTS' YEAR-END HANDOFFS Maya H. Dulay^{1, 2}; Melissa Bachhuber^{1, 2}; Rebecca L. Shunk^{1, 2}; Bridget C. O'Brien². ¹San Francisco VA Medical Center, San Francisco, CA; ²University of California, San Francisco, San Francisco, CA. (Tracking ID #2199524)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): At the end of each academic year, PGY3 internal medicine residents identify patients from their continuity clinic panel who they deem sufficiently high-risk to warrant a comprehensive handoff without the benefit of an objective metric to assist in high-risk patient identification.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): • To critically review residents' processes for selecting which panel patients need a handoff and why. • To compare residents' selection to an objective indicator of patients' risk for hospitalization or death - the Care Assessment Need (CAN) Score. • To evaluate the utility of providing residents with patients' CAN scores when they select patients for handoff.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): At the end of each academic year, 18 PGY3 internal medicine residents who have continuity clinic in a San Francisco VA primary care clinic receive a list of all patients currently assigned to them. They are asked to review their panel patients and identify high-risk/high-complexity patients who should be transferred to a PGY2 or faculty provider rather than to a new PGY1. The residents are then expected to complete a written and an optional oral handoff to the new primary care provider. At the end of the 2014 academic year, we introduced an intervention in which PGY3 residents received CAN scores for all patients on their panels prior to transfer. CAN scores are a validated metric developed within VA to identify patients at high risk of death or hospitalization within 1 year. After first identifying patients for a handoff based upon their own assessment, the PGY3s reviewed their panel patients' CAN scores to compare their own selections with objective metrics. In one-hour small group sessions a faculty member explained the CAN score metric to residents, then asked them to review their panel data / handoff selections, make any changes based on CAN scores and explain what factors led them to select patients for handoff.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/

INTERVENTION): PGY3 average panel size was 75 (SD 18.1) and panels had an average of 6 patients (SD 3.7) with a high CAN score (≥ 95 out of 100). Prior to the CAN score review, PGY3's selected 10 patients on average (SD 5.6) or 13 % of their panel for a handoff. Of these, an average of 3 patients (SD 2.3) had CAN scores ≥ 95 (58 % of high risk patients identified by CAN score). We conducted small group discussions with residents to explore their thought processes.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): PGY3's made few adjustments to their list of handoff patients after viewing CAN scores (3 residents, 10 patients added for handoff). They listed several reasons why patients who had high CAN scores were not selected for handoffs, including patients having: many issues that are well-controlled, one or two major issues that are relatively easy to manage, a strong support system, significant improvements in health, or co-managed care by a non-VA provider. There were 12 patients who had high CAN scores and had never been seen by the PGY3. This prompted discussion of how best to approach care for these patients to ensure quality and safety. PGY3s identified several reasons for selecting patients for handoff despite not having a high CAN score. These included: personality, behavioral or mental health concerns; management challenges despite low risk for morbidity and mortality; patient engagement in risky behaviors; or a complex situation that is difficult to glean from the chart.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): PGY3s made few changes to their handoff choices after reviewing CAN scores and identified several factors that are important for handoff selection but are not well reflected in CAN scores (e.g. psychosocial and behavioral issues). Nonetheless, they indicated that CAN scores provided helpful information to incorporate into their decisions and recommended including these or similar risk-related metrics with their panel for year-end review. Utilizing an objective risk indicator to augment clinical judgment may particularly help residents reduce reliance on availability heuristics when identifying high risk/high complexity patients.

IMPROVING PATIENT AND PROVIDER COMMUNICATION THROUGH MULTIDISCIPLINARY ROUNDING WITH THE USE OF A DISCHARGE PLAN TASK LIST Sarvenaz Alibeigi; Sunita Mistry; Blake Gregory. Alameda Health System - Highland Hospital, Alamo, CA. (Tracking ID #2192563)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Does a unit-based, multidisciplinary model of rounding improve patient satisfaction and communication between providers and the patient?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To improve communication of the care plan and discharge plan between health care providers and the patient. 2. To improve patient satisfaction and understanding of the care and discharge plans. 3. To reduce re-admission rates by enhancing patient understanding of discharge plan.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): An inpatient pilot was conducted over a three week period on Mondays through Fridays, with a total number of 16 patients enrolled in the pilot. The intervention implemented a multidisciplinary team rounding approach. The members of the team included: attending physician, senior resident, a designated unit social worker, a designated unit care coordinator, a designated unit clerk, the bedside nurse, and the patient. The setting for this pilot was a 9-telemetry bed unit with a 3:1 patient to nursing ratio. This unit was chosen specifically for the variety of patients that are admitted there and the geographic layout of that unit. Medicine patients were assigned overnight to that unit based on their level of acuity and estimated length of stay, they were then transferred over to the "pilot team" the following morning. The "pilot team" continued to care for all assigned patients until discharge. The intervention consisted of twice daily rounds with the multidisciplinary team at the patient's bedside. The morning rounds were more comprehensive and detailed, while the afternoon sessions involved reviewing a checklist. The morning rounds were scripted and focused on the patients care plan and discharge plan. The discharge task list was continuously referred to by the care coordinator and the designated tasks were acknowledged by the various team members. The focus of the morning rounds was to confirm the patient's awareness and agreement of their discharge plan. The focus of the afternoon rounds was to confirm all the necessary tasks for the day were being completed by the appropriate provider in a timely manner by referring to standard of work on the discharge task check list.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/ INTERVENTION): To measure improvements in communication, we surveyed the providers involved in the pilot and asked them to compare the "pilot rounds" with conventional rounding. To measure patient satisfaction we administered a survey to all

16 pilot patients and 16 control patients and focused the questionnaire on patient understanding of their discharge plan and their overall satisfaction with their hospital stay. We measured patient re-admission rates to our hospital at 30 days and 90 days and compared it to our current hospital average 30 and 90 day readmission rates. Successful transition of care to the patients' medical home was a major focus, with a goal of connecting patients to a primary care provider within two weeks of discharge. To measure this we contacted the medical home within two weeks from discharge to verify that the patient was evaluated.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Survey results revealed that patients in our pilot had a greater understanding of their medical condition and discharge plan compared to a control group that used conventional rounding. Patients in the study group also reported a preference to return to our hospital for future care, compared to the control group. Based on our survey results, we were able to show that providers involved in the pilot program felt the process was more patient centered and their tasks were more appropriate compared to our current usual practice. Patients involved in the pilot had a zero percent 30-day readmission rate and a 7 % 90 day readmission rate. This is a marked improvement compared to our current hospital average 30 day readmission rate of 10 % and our 90 day readmission rate of 25 %.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our pilot program improved patient and provider satisfaction while enhancing communication amongst all members of the patients care plan. We achieved this without additional resources or staffing increases. With enhanced communication and a standard format for discharge tasks, the discharge process became more streamlined and tasks were done in a timelier manner compared to current practice. In an attempt to preserve the benefits of our pilot, we have restructured our social workers and care coordinators into a unit based model. Our next phase is to pilot a "huddle" involving several medicine teams, the care coordinator, and social worker in each unit. We plan to focus these huddles on individual patients' discharge planning needs while following the outline of the discharge task list that we have created.

IMPROVING THE ACCURACY AND EFFICIENCY OF THE MEDICATION RECONCILIATION PROCESS AT INTERNAL MEDICINE OUTPATIENT APPOINTMENTS Wendy Fiordellisi¹; Chris Goerd²; Cheryl Alberhasky¹; Sue Behrle¹; Krista M. Johnson². ¹University of Iowa Hospitals and Clinics, North Liberty, IA; ²University of Iowa, Iowa City, IA. (Tracking ID #2178875)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can the accuracy and efficiency of the medication reconciliation process at internal medicine outpatient appointments be improved?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Assess the accuracy and efficiency of the medication reconciliation process at internal medicine outpatient appointments at the University of Iowa. 2. Identify and implement potential improvements to the process. 3. Measure the change in accuracy and efficiency of the medication reconciliation process post intervention.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The University of Iowa Internal Medicine Outpatient Clinic is an academic primary care practice located in Iowa City, IA, staffed by 15 medical assistants (MAs), 5 nurses, 12 staff physicians, and the University of Iowa Internal Medicine residents. In order to assess the accuracy and efficiency medication reconciliation, we surveyed MAs, residents, and staff physicians about their perceptions of the process. We performed direct observation of MAs during their portion of medication reconciliation. We also interviewed patients after their appointments and reviewed the medication lists their "After Visit Summary" (AVS) to identify errors. Our pre-intervention data (see below) showed that neither the MAs nor physicians thought the current process was accurate or efficient. There were a surprisingly high number of medication errors on patients' AVS, which reflected the medication reconciliation performed by the physician. We found that the reconciliation performed by the MA, in a separate part of the medical record, was more accurate than the AVS. On survey, physicians admitted that they rarely used the information from the MA medication reconciliation when updating medication lists in their portion of the medical record. With this information, we formed an interprofessional task force, including staff physicians, residents, nurses, MAs, pharmacists, and information technologists, to create a process map, review the current medication reconciliation process, and identify potential improvements. Based on the recommendations of the task force, the following interventions were implemented: -MAs stopped recording the "date of the last dose" of each medication during their portion of the medication reconciliation process. -Physician medical record screen settings were adjusted to more easily view the medication reconciliation information entered by the MAs. -A "Welcome Encounter" report was printed for physician review for each patient appointment. This report differed from the report used prior, as it displayed not only the medication list but also the medication reconciliation notes made by the MA. -All clinic staff were educated

regarding the complete medication reconciliation process as well as their individual responsibilities in the process. The importance of medication reconciliation was stressed. Staff were encouraged to seek the help of clinic pharmacists for complicated cases.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): -MAs and physicians were surveyed to assess 1) their perception of the efficiency of the medication reconciliation process both pre and post intervention and 2) whether each intervention implemented was helpful in the medication reconciliation process (Likert scale). -Medication lists were reviewed with patients and the accuracy of medication reconciliation performed by both MAs and physicians was measured both pre and post intervention (student's *t*-test and chi square).

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): -Rating of efficiency of the medication reconciliation process (on scale of 1-5 with 5 being most efficient) improved from 2.4 to 3.6 (MA, $p=0.001$), 2.4 to 3.7 (residents, $p=0.002$) and 2.5 to 3.0 (staff physicians, $p=0.2$), (total, $p<0.001$). -The total number of errors on AVS decreased from 102 to 44 ($p=0.006$). The number of patients with at least one error on AVS decreased from 41 to 20 ($p<0.001$). -The number of errors noted by MAs that were not updated by physician on AVS decreased from 32 to 18 ($p=0.2$). The number of patients with at least one error noted by the MA but not updated by the physician on the AVS decreased from 20 to 11 ($p=0.1$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): -Improvements in medication reconciliation require the involvement of the entire healthcare team (medical assistants, nurses, physicians, pharmacists, and information technologists). -Communication amongst all members of the team is crucial to accurate medication reconciliation. The electronic medical record must be used appropriately so that it is a help, not a hindrance, to this process.

IMPROVING THE REACH AND ADOPTION OF SCREENING, BRIEF INTERVENTION, AND REFERRAL TO TREATMENT (SBIRT) SERVICES IN A PATIENT CENTERED MEDICAL HOME (PCMH) USING A MULTIMODAL IMPLEMENTATION INVOLVING PRACTICE REDESIGN Jeanne Morley⁵; Sandeep Kapoor^{3, 4}; Megan O'Grady¹; Jennifer Verbsky²; Nancy Kwon³; Mark Auerbach⁶; Jon Morgenstern³; Charles Neighbors⁷; Joseph Conigliaro⁵. ¹National Center on Addiction and Substance Abuse at Columbia University, New York, NY; ²North Shore LIJ Health System, Great Neck, NY; ³North Shore Long Island Jewish Health System, New Hyde Park, NY; ⁴The Feinstein Institute for Medical Research, Manhasset, NY; ⁵North Shore Long Island Jewish Health System, Manhasset, NY; ⁶North Shore Long Island Jewish Health System, Bay Shore, NY; ⁷The National Center on Addiction and Substance Abuse at Columbia University (CASA/Columbia), New York, NY. (Tracking ID #2196756)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can SBIRT services be successfully integrated into a busy urban/suburban PCMH with parallel Faculty and Residency Internal Medicine Practices?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1) Establish a robust SBIRT program in a PCMH with no preexisting protocol for alcohol/substance misuse screening or treatment. 2) Use the Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) model combined with a Rapid-Cycle Improvement strategy (Plan-Do-Study-Act) to guide workflow changes and interventions to improve Reach of SBIRT services and enhance provider acceptance (Adoption). 3) Utilization of SBIRT services as an educational tool to improve Adoption among physicians in training (Residents), increase their awareness of alcohol/substance misuse among patients, demonstrate the value of brief interventions (BI)/motivational interviews in this population, and increase appreciation for a team based approach by leveraging the SBIRT care model.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In 2013 a partnership (NYSBIRT-II) was established between the North Shore-Long Island Jewish Health System, the National Center on Addiction and Substance Abuse at Columbia University (CASA/Columbia), and the Office of Alcoholism and Substance Abuse Services (OASAS), funded by Substance Abuse and Mental Health Services Administration (SAMSHA), to build a sustainable SBIRT program within an integrated Hospital System focusing on Hurricane Sandy affected areas in the New York metropolitan area. By the end of the 5-year funding, the model developed for Emergency Departments and Primary Care will serve as the basis for subsequent dissemination of SBIRT services throughout New York State. This abstract outlines the implementation process during year one of NYSBIRT-II, at the alpha Primary Care site. Initial implementation occurred as follows:1) Medical Office Assistants (MoA) administered a 5-question SBIRT Prescreen for alcohol, drug, and tobacco use during vital

sign measurement at each provider visit; 2) a SBIRT Health Coach (HC) reviewed prescreens in real time to identify at risk patients; 3) the HC approached prescreen positive patients to complete a full screen (AUDIT and/or DAST-10); 4) after completion of the physician visit the HC performed a BI and/or referral to treatment based on full screen scores. We performed repeat PDSA cycles to facilitate timely identification of problems and rapid testing of workflow modifications. Intervention examples include: staff/physician education, staff engagement via feedback sessions for workflow adjustments, Industrial Engineering evaluations and practice redesign. One recognized concern was the significantly lower prescreen rate among patients roomed by Residents compared to MoAs.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Quantitative Measures: 1) Reach: Completion of SBIRT prescreens in patients arriving for office visits (% of patients receiving SBIRT prescreen among all patients seen). Benchmark set at 80 %; 2) Effectiveness: Delivery of intended services (% of patients receiving a full screen and intended services among all prescreen positive patients). Qualitative Measures: Adoption: We used standardized surveys, as well as feedback sessions with MoA's, Residents, and Attendings to assess engagement and attitudes towards SBIRT services.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Year 1: A total of 20,292 patients were prescreened yielding a Reach of 75 % with 2540 positive prescreens (13 %). A total of 1567 full screens were administered, yielding an Effectiveness of 62 %. Full screen positive patients totaled 460 resulting in 457 BI with 69 patients referred to further treatment. Average Prescreen Rate (PSR) was 80 % for Faculty Practice (FP) and 55 % for Resident Practice (RP). Strategies piloted to improve Reach within the RP were unsuccessful in achieving sustained benefit. Example Interventions: 1) Resident Training (PSR 31 %→56 %); 2) Individual Feedback Sessions (PSR 48 %→61 %, drop-off to 52 % after sessions ended). Unrelated to SBIRT, our Industrial Engineering Department evaluated the practice design, concluding that exam room utilization/allocation provided suboptimal practice efficiency (ie. excessive patient wait time). Based on their report, a "POD" system was implemented in August 2014 and directly impacted SBIRT Prescreen completion rates by changing workflow so all patients were roomed by MoAs. POD Implementation (PSR 47 %→85 %) – *Benchmark achieved and sustained

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The PCMH is a suitable model for delivery of SBIRT services with greater Reach amongst FP patients compared to RP patients. Using the RE-AIM model and a Rapid-Cycle Improvement strategy (PDSA), delivery of SBIRT services were improved with practice redesign yielding the greatest and most sustained improvement. Intervention strategies should be tailored to individual practice preferences and conditions, to insure maximum reach into target populations. Encouraging a collaborative team approach by appreciating and eliciting input from front-line staff (via feedback sessions) can yield informed workflow changes and prove to be a successful strategy in improving Reach and Adoption.

IMPROVING THE SAFETY OF ICU TO FLOOR TRANSFERS—"TICKET TO RIDE" Faisal Siddiqui^{1, 2}; Morgan Jones²; R. Neal Axon^{1, 2}. ¹Charleston VAMC, Charleston, SC; ²MUSC, Charleston, SC. (Tracking ID #2197518)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Facilities with 'closed' intensive care units (ICU) often experience delays in bed availability spanning work shifts which complicate communication and can result in missed patient handoffs.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Prevent delays in floor team notification when patients are transferred from the ICU (i.e. missed handoffs). 2. Reduce delays in initiating ICU transfer orders. 3. Prevent transfer of medically unstable patients from ICU.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Patient handoffs have been the subject of increased study in recent years. Nevertheless, handoff quality often remains poor; a recent systematic review found a 13 % information error rate. Additionally, handoffs are ineffective when they are simply not performed. Transfer of patients from the ICU to ward is less well studied, but these handoffs are arguably more important given patient complexity. In response to a series of near-miss episodes where ICU patients were transferred from our ICU without proper handoffs, we sought to improve facility performance. A multi-stakeholder team of physicians, nurses, and clerical personnel mapped transfer/handoff processes and analyzed performance gaps. Our Internal Medicine program already had a well-established handoffs curriculum/system in place, but a critical area of delay was identified between the time of initial bed request and the actual time of bed assignment and patient transfer. In some cases, this delay was over 12 h and spanned

multiple work shifts. There were also instances of delayed initiation of transfer orders with the potential for missed medications or treatments. We devised a simple checklist, called the "Ticket to Ride" (TiR), which forces a face-to-face, standardized interaction between the transferring and accepting physicians and other team members at the time of bed assignment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We performed intermittent audits of TiR forms to track implementation. We also reviewed charts of consecutive ICU transfer patients comparing 3 months pre-intervention ($n=71$) to 3 months post ($n=80$). Mean times (in minutes) were examined using Students t test, and proportions were compared using Pearson chi square.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We observed no further episodes of 'missed handoffs' after TiR implementation. Post implementation, the proportion of accept notes written before transfer increased significantly (41 vs. 22 %, $p=0.01$). Among transfer notes written after ICU transfer, mean time to first accept was not significantly changed (113 vs. 103 min, $p=0.53$). Only 2 patients required ICU readmission pre-implementation, and none post-implementation. Finally, we observed a significantly lower proportion of in-hospital deaths among ICU transfers (5 vs. 15 %, $p=0.03$) post-implementation.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1. Use of a standardized checklist requiring signatures is a simple, seemingly effective means for prompting providers to complete patient handoffs at the time of ICU transfer. 2. Early accept note completion improved post implementation indicating more prompt ward team evaluations. 3. Observed differences in mortality after implementation are intriguing and may be the subject of future study. Nevertheless, we do not interpret these results as causal as it relates to the TiR without analysis of a larger sample with adjustment for potential confounders.

INCREASING VALUE ACROSS FOUR HOSPITALS THROUGH A HOSPITALIST-LED QUALITY IMPROVEMENT PROGRAM: TOP-DOWN SUPPORT FOR BOTTOM-UP CHANGE TO DECREASE LENGTH OF STAY AND COST OF CARE Henry J. Michtalik^{1, 2}; Bishara Bates⁴; Robert E. Hody²; Phillip Phan^{3, 2}; Melinda Kantsiper⁵; Jodi Rennert-Ariev⁶; Laura Winner²; Daniel Brotman¹; Patricia Wachter²; Eric J. Park⁷; Eric Howell^{6, 2}. ¹Johns Hopkins Hospital, Baltimore, MD; ²Armstrong Institute for Patient Safety and Quality, Baltimore, MD; ³Johns Hopkins University, Baltimore, MD; ⁴Johns Hopkins Medicine, Baltimore, MD; ⁵Howard County General Hospital, Columbia, MD; ⁶Bayview Medical Center, Baltimore, MD; ⁷Johns Hopkins Community Physicians, Bethesda, MD. (Tracking ID #2199163)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In multi-site health systems, hospitalist programs in different hospitals may not directly interact or even use the same metrics to evaluate quality of care, leading to high variability in both the cost and quality of care. In an environment focused on maximizing value to patients, strategies to align incentives, share knowledge, and empower change are desperately needed.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To develop an inter-hospital collaborative program of hospital administrators, hospitalist program directors, hospitalists, lean sigma experts, and data analysts to: (1) develop consistent performance metrics across sites and identify high-value targets for intervention; (2) provide analytic and lean sigma support while empowering local staff to make changes; and (3) measure and disseminate improvements.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In 2013, four separate hospitalist programs in the Johns Hopkins Medical Institutions collaborated with the Armstrong Institute for Patient Safety and Quality to increase hospitalist-driven value. A multi-level strategy involving front-line providers, hospitalist program directors, and hospital administrators was used to perform a needs assessment, garner financial support, and develop performance metrics. Metrics were selected based on ability to have a positive impact on both quality and cost, required consensus, and were reviewed via quarterly meetings with all parties. Two key metrics were length of stay and cost per patient admission, around which a data-driven dashboard, known as the A3, was created for each site. The one-page A3 for each hospitalist program communicated a common goal, data and observed trends; identified potential causes and interventions; documented completed and future steps; and assigned specific benchmarks, roles, responsibilities, and due dates. Local, customized solutions to achieve metric targets were encouraged at each site. Barriers and progress were assessed through the use of monthly hospitalist "clinical communities" meetings consisting of all hospitalist program directors, weekly on-site meetings, monthly project champion meetings between site leaders, and quarterly performance reviews with system leaders.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Success was measured by (1) engagement of front-line staff; (2) implementation and maintenance of individualized interventions; and (3) achievement and sustainment of individual site length of stay and cost benchmarks.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Local teams consisting of over 100 hospitalists, 30 administrators, 7 program leaders, 4 lean sigma experts, and 2 data analysts developed and evaluated 12 customized interventions to decrease length of stay and cost of care and improve quality of care, including orthopedic co-management, early patient ambulation, and a high intensity discharge protocol for selected patients. Length of stay targets were exceeded at 3 of the 4 hospitals, with year over year reductions of at least 0.1 days per case. Because hospital day costs in the state of Maryland can vary both by time period and site, adjustments were needed to harmonize cost comparisons. Additional methods were developed to differentiate cost savings from reduced length of stay versus more efficient use of resources. In the first year of the program's inception, a net \$759,000 was saved.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): This program aligned the goals of 4 diverse hospitalist programs while encouraging the development of local solutions. By sharing metrics, system-wide access to data, and using strict reporting procedures, the program provides powerful oversight without micro-management and accelerates learning and innovation at the local and system levels, resulting in a significant return on investment.

INTEGRATING LONG-ACTING REVERSIBLE CONTRACEPTION INTO AN ACADEMIC PRIMARY CARE PRACTICE Lydia E. Pace³; Brigid M. Dolan⁴; Lori W. Tishler²; Holly Gooding¹; Deborah Bartz³. ¹Boston Children's Hospital, Boston, MA; ²Brigham and Women, Boston, MA; ³Brigham and Women's Hospital, Boston, MA; ⁴Northwestern University, Chicago, IL. (Tracking ID #2198772)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Long-acting reversible contraceptive (LARC) methods are highly effective at decreasing unintended pregnancy and are safe in most chronic medical conditions, but remain underutilized in general internal medicine practices, largely because few internists are trained in device placement.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The goal of this Innovation in Clinical Practice was to facilitate patients' access to LARC in the primary care setting by: 1) creating a training model to allow general internists to attain competence in intrauterine device (IUD) and implant placement, 2) developing a clinical protocol and system to provide LARC services on-site, and 3) building the educational infrastructure and foundation for internal medicine resident training in LARC.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We implemented this program in an academic general internal medicine practice in an urban Boston teaching hospital. For the past 3 years, this practice has been undergoing transformation toward team based care, with a goal of achieving National Center for Quality Assurance Patient-Centered Medical Home status. The practice has 18,000 unique patients and over 50,000 patient visits per year. Many patients are medically underserved and socially complex. Development of an on-site LARC program involved multiple steps: 1) engagement of clinic leadership; 2) development of a collaborative relationship with an obstetrician-gynecologist at our institution willing to advocate for this project and train an internist in LARC placement; 3) commitment of clinic funds to purchase LARC devices, needed equipment and consumables to make them available on-site; 4) development of a training program for the internist that overcame the challenges of unpredictable LARC opportunities and the competing imperative of teaching ob/gyn residents; 5) launch of a biweekly LARC clinic within the primary care practice, including identifying support staff; developing a stock strategy for devices; creating templates for referral, notes, billing, scheduling, and consents; and developing practice protocols; and 6) patient recruitment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Initial measures utilized include the numbers of procedures completed during training, number of patients served in the LARC clinic, and preliminary information on costs and revenues for the clinic. Future measures will include patient satisfaction, detailed assessment of clinical outcomes and complications, and number of internal medicine residents trained.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The training in IUD placement involved 7 half-day sessions, including sessions with models, with patients in the hospital's Family Planning and gynecology

clinics; 10 IUD insertions were completed during training. For implant training, the internist completed a pharmaceutical company-sponsored training and then was observed placing implants by the ob/gyn. Following launch of the dedicated LARC clinic, 24 patients presented for LARC services in our primary care practice over 8 months. Eleven patients received an IUD, 6 received an implant; 2 of these were provided by residents under supervision. Four patients had an IUD removal. For 3 patients requesting an IUD the device could not be placed in the clinic, requiring referral to the ob/gyn service. One patient had an IUD expulsion 5 months after placement; we are not aware of any other complications. Initial costs to the clinic for materials and extra malpractice coverage for the internist provider were about \$1800. Up-front purchase costs for a levonorgestrel IUD and etonorgestrel implant were approximately \$650 each. Indirect costs included medical assistant time and office space. Procedure charges were approximately \$1100 for IUD insertion and \$2500 for implant placement.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): LARC training and service integration into an academic general internal medicine practice are feasible but require strong multidisciplinary collaboration, administrative support, clinician commitment, and up-front financial investment. Further evaluation will determine whether patients are satisfied with this service and perceive that it lowers barriers to LARC use. In-depth analysis of costs and revenues will also be performed. As the program continues, incorporation of internal medicine resident training is a primary goal. By eliminating cost-sharing for contraception among privately-insured women, the Affordable Care Act is expected to increase demand for LARC. Increasing the number and types of providers able to provide LARC, and integrating services into primary care, have the promise to further decrease barriers to these methods, reducing unintended pregnancies and improving women's health.

LAG BETWEEN PUBLICATION AND IMPLEMENTATION: JOURNAL CLUB TO BEDSIDE EXAMINING PRACTICING PHYSICIAN BEHAVIORS IN PRESCRIBING AZITHROMYCIN: A QUALITY IMPROVEMENT STUDY Midhun Malla; Libu Varughese; Byron Reichert; Huong Nguyen; Natalie Como; Gerard Hoatam; Tam Chu; Priya Radhakrishnan. St.Joseph's Hospital and Medical Center, Phoenix, AZ. (Tracking ID #2199529)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): As part of our antibiotic stewardship and patient safety initiative, we examined the physician Z-pak prescribing patterns and whether there was assessment of cardiac risk prior to prescribing the medication.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Reduce the lag time between latest body of evidence and its implementation 2. Assess antibiotic prescription behavior patterns of physicians 3. Increase physician's awareness of potential toxicity of prescribing Z-pak

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Data was extracted from the Ambulatory database from the adult primary care clinics from May 2011 to August 2014. We compared the Z-pak physician prescription behavior patterns and assessment of cardiac risk by ordering electrocardiograms (EKGs). We used 2012 as a milestone year (based on study publication). We analyzed whether there was an increase in the number of EKGs ordered to assess if physicians checked a baseline QT interval prior to prescription especially in patients who were on arrhythmogenic medications or had a diagnosis of QT prolongation. As a secondary outcome, we compared the percentage of Z-pak prescriptions with that of other antibiotics like Amoxicillin, Levofloxacin, and Ciprofloxacin.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Follow the trends of Z-pak prescriptions after the publication of NEJM study in 2012 2. Increase in the number of cardiac risk assessments (EKG) prior to prescribing Z-pak 3. Encourage physicians at our academic institution to have a lower latent period between publication of literature to clinical practice

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): A total of 7415 antibiotics were prescribed during the study period (2011–2014). Of these, 34 % were Z-Pak, 22 % Ciprofloxacin, 35 % Amoxicillin and 9 % Levofloxacin. Of the 2499 Z-Pak prescriptions, 381 patients were identified as having potential risk for cardiac events (arrhythmogenic medications, or documented long QT). Only 77 (3.08 %) had an EKG performed in the previous 30 days. Of note, none of the 4 patients with a history of QT prolongation had an EKG ordered. We also looked at whether there was an increase in cardiac risk assessment after the publication of the NEJM study in 2012, as a marker of increased awareness for the need to assess QT interval.

The percentage of EKGs increased from a baseline of 1.92 % to 3.64 and 4.19 within the first and second year respectively, after the study was published.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): At the conclusion of the first part of our QI project, we have identified a significant need for development of processes to enhance patient safety. While the number of EKGs performed has doubled since May 2011, there is still a significant number of at risk patients (documented QT prolongation or on arrhythmogenic medications) who did not receive the risk assessment. This lag between publication of the article and lack of clinical translation is consistent with the published literature. This is concerning given the point of care alerts displaying recommending caution with prescription in most EHR. Our study raises questions on optimal safety processes in regards to the prescription behavior that can endanger patients. While it is a QI project and not powered to assess a statistical significance, it raises alarm about the ability of the EHR to pick potential medication side effects and provider's ability to change behaviors. It is important for physicians to be aware of these dangers while taking care of patients with cardiac conditions presenting with 'simple' illnesses. It is important to develop a process to ensure up to date evidence based medicine is being practiced at the point of care. This study also highlights the use of 'big data' to assess practicing behaviors of physicians at a time where maintenance of certification is a hotly debated topic.

MULTIDISCIPLINARY INTERVENTION TO IMPROVE CARE TRANSITIONS Tafadzwa Muguwe; Nathalie Bloch; Orissa Viza. Mount Auburn Hospital, Cambridge, MA. (Tracking ID #2198587)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Evaluating the efficacy of a low cost multi-disciplinary intervention package in the hospital and primary care offices in order to improve healthcare quality while reducing healthcare costs as well as urgent care visits and re-hospitalizations within 30 days of discharge.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Aim 1: To develop and implement a multi-disciplinary transitions intervention with contributions from hospital and primary care personnel. Aim 2: To evaluate the effects of this intervention on post-discharge adverse events, functional status, patient satisfaction, as well as urgent care and hospital utilization within 30 days of discharge.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The study will compare 30-day re-hospitalization rates between patients admitted during a six month period in 2014 (prospective intervention arm) and patients admitted during a similar time period in 2013 (retrospective non-intervention arm). The intervention in the hospital will consist of a discharge process that includes: obtaining updated contact information to be accessed within 48 h after the discharge; scheduling a follow up appointment with the primary care provider before discharge; and updating the patient and the patient advocate with a phone number to call in case of a medical issue before the primary care physician resumes care. After the discharge, the intervention will include: a follow up phone call to patient/advocate within 48 h of discharge from the primary care provider; and follow up appointment with the primary care provider within 7–14 days of discharge depending on the acuity of the medical condition. The hypothesis is that implementation of the intervention described above will reduce 30-day urgent care or hospital use. Data regarding the retrospective non-intervention arm (2013) will be obtained from medical records. These data will include any visit to an urgent care center or hospitalization during 2013.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Thirty day re-hospitalization rates Percentage of 48 your phone calls completed post-discharge Percentage of patients making scheduled 1–2 week outpatient appointments post-discharge Qualitative survey of patient satisfaction

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Uptake of the intervention has been largely successful, with almost all patient discharged with a follow-up appointment scheduled within 1–2 weeks of discharge. On the outpatient side there has been greater than 50 % adherence to the 48 h phone call by all outpatient practices, with some practices approaching 100 % adherence. Almost all patients that receive the 48 h call do show up to the scheduled appointment, proving the efficacy of the call. We are now in the process of calculating 30-day re-hospitalization rates for 2014, which will then be compared with pre-intervention rates from 2013.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The hypothesis is that implementation of the intervention described above will enhance overall patient satisfaction and lead to a reduction in 30-day urgent care or hospital use. The

intervention is low-cost and simple, including a thoughtful discharge process and a follow up phone call at 48 h post-discharge to ensure that any patient issues are addressed prior to a scheduled follow appointment. Timing of follow up appointment is based on predetermined acuity of patient's medical condition, and this is vital to meeting the project objectives. If proven to work, the intervention described here can be easily up scaled to other services in the hospital and lead to reduction in readmissions and immense cost-savings across the healthcare system.

POST DISCHARGE INTENSIVE CARE TO REDUCE READMISSION RISK FOR HIGH RISK PATIENTS Geoffrey C. Lamb¹; Mary Conti²; Hope Benthien³; Susan Dummer²; Sandra S. Green³. ¹Medical College of Wisconsin, Milwaukee, WI; ²Froedtert Hospital, Milwaukee, WI; ³Froedtert Health, Milwaukee, WI. (Tracking ID #2199426)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A review of patients readmitted to our hospital from primary care practices affiliated with our system revealed that the majority had complex illness and were readmitted despite having seen a primary care provider (PCP) within 7 days of discharge.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To reduce 30 day readmissions among high risk patients utilizing a multidisciplinary intensive management program within the context of a medical home.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The project focused on patients admitted from a single internal medicine clinic affiliated with the hospital and certified as a NCQA level 3 medical home. Patients were risk stratified on admission using a tool derived from Project BOOST and tested within our hospital population. Patients at highest risk for readmission (predicted readmission rate 35 %) were invited to participate. Eligible patients were interviewed using a standard tool addressing social, financial, disease knowledge, self-care ability, medication, and transportation issues. Patients were excluded if they were receiving chemotherapy, discharged to a nursing facility or in hospice. An APNP in the clinic was contacted prior to discharge to initiate the handoff process. A home care referral was initiated and the patient seen at home within 24 h by an RN and social worker. The patient was scheduled in clinic within 72 h, evaluated by the PCP or APNP and met with a pharmacist to review medications. A weekly huddle was held with the APNP, home care RN, and a care coordinator. The patient also received a weekly phone call from the care coordinator. After hours, patients were instructed to call the home care nurse.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The principle outcome measure was rate of readmission within 30 days following the index admission. True costs and direct margin (combined hospital and out-patient) for 60 days prior and 60 days after enrollment in the program were calculated. Performance was compared to 2 affiliated internal medicine clinics with a similar demographic.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Sixty-three patients were flagged as high risk by the tool. Twenty-seven were excluded, 14 declined and 22 agreed to participate. Prior to the intervention targeted patients had a readmission rate of 34.6 %. During the intervention the readmission rate among participants dropped to 11.9 % while nonparticipants remained at 36.4 %. Over the same period, comparison clinic A went from 20.5 to 21.6 % and clinic B went from 31.3 to 36.4 %. Total cost per case in the study group decreased 44 % after the intervention (\$6860 to \$3839). However the margin per case dropped (\$1789 to (–) \$1922). In contrast, clinic A cost went up (\$5053 to \$19,509) and margin went up (\$1321 to \$5520). All eligible patients qualified as home bound allowing the home care agency to cover their costs by billings.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Intensive management of patients at very high risk for readmission can lead to significant reductions in the readmission rate and a net reduction in costs. However, under current payment structures, loss of income from the second hospitalization can lead to a net negative margin unless costs can be recouped by other means or lower cost providers utilized.

PRIMARY CARE—SPECIALTY CARE ROUNDTABLES: A CASE-BASED DISCUSSION SERIES TO IMPROVE REFERRALS AND CO-MANAGEMENT Nathaniel Gleason¹; Sara Ackerman²; Ralph Gonzales². ¹UC San Francisco, Nathaniel Gleason, CA; ²UCSF, San Francisco, CA. (Tracking ID #2199704)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Major deficiencies in the Primary Care—Specialty Care interface, including insufficient information

in referrals, mismatched expectations, poor care coordination, and insufficient communication from specialist back to primary care providers (PCPs). Serendipitous interactions between PCPs and specialists have decreased in many settings with the introduction of electronic health records and the loss of physical proximity in the hospital as PCPs increasingly work exclusively in outpatient settings.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. To develop a structured forum in which PCPs and specialists can review the evaluation and management of the conditions most frequently referred or co-managed 2. To identify gaps in mutual understanding of appropriate timing of referral, pre-referral evaluation, and of the return of clinical management to the PCP 3. To use the case-based forum to develop and improve diagnosis-specific, local guidelines for referrals and electronic consultation (eConsult).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): A lunchtime conference series features a single specialty with three 1-h sessions to optimize PCP attendance. Two specialists join PCPs, invited from across the organization. Cases are elicited from PCPs with individualized lists of recently-referred patients. Introductions are made by all participants to stress relationship building. With brief case presentations by PCPs, the group defines high-yield clinical and care-delivery questions to address. These are captured for later dissemination to all PCPs. Internal referral guidelines and the utility of eConsult are reviewed in conjunction with relevant cases. A laptop-mediated video conference connection was offered to PCP practices at other physical sites.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): A goal of delivering 15 conferences (5 specialties) per year was set. A survey was sent to all PCPs ($n=172$) after the first 12 conferences with 3 questions about the usefulness and desired frequency of the conferences. Sixteen PCPs and 10 specialists were interviewed about referrals and care coordination broadly, including a question about the utility of the Roundtables.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Participating specialties to date include cardiology, endocrinology, gastroenterology, hepatology, rheumatology, nephrology, pain management, neurology, orthopedics, psychiatry, and urology. Forty-one PCPs returned surveys (24 %), with the PCPs at other sites representing the majority of non-responders. Seventy-six percent of respondents found the conferences to be “very useful for improving your disease management strategies and referral decisions in Primary Care?” 88 % felt that the topic of co-management was “very important” to primary care. Thirty-nine percent desired monthly conferences and 42 % desired every-two-month conferences. Qualitative comments to the survey were strongly positive, finding the sessions to be “very high-yield.” The value of both the clinical and the care-delivery information frequently cited. “Putting a face to a name” is among the most frequently cited strengths.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): PCPs and specialists cite the in-person interaction – in a care delivery environment in which nearly all co-management communication takes now place electronically—as a fundamental strength of these conferences. Inclusion of remote primary care sites via low-quality video conference had low participation and low survey response. The case-based format provides a familiar structure, and the premise of the conference allows discussion of both clinical and care delivery topics. This format provides a unique opportunity to address a growing problem in care coordination.

PRIMARY CARE PHYSICIAN-PHARMACIST COLLABORATIVE MEDICATION MANAGEMENT SERVICE THROUGH A BENZODIAZEPINE OUTREACH CLINIC AT A UNIVERSITY-BASED INTERNAL MEDICINE CLINIC

Danielle F. Loeb¹; Carmen L. Lewis²; Huong M. Lam¹; Katy E. Trinkley³. ¹University of Colorado Denver, Aurora, CO; ²University of Colorado, Denver, NC; ³University of Colorado School of Pharmacy, Aurora, CO. (Tracking ID #2188200)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Inappropriate use of benzodiazepines increases known risks of falls, asthenia, impaired cognition and memory, substance abuse, and the potential to worsen anxiety.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): **Objective 1:** Decrease the proportion of patients inappropriately prescribed benzodiazepines in a university-based internal medicine clinic. **Objective 2:** Decrease anxiety symptoms through improved medication management. **Objective 3:** Improve primary care provider (PCP) understanding of appropriate benzodiazepine use.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We are implementing a PCP-pharmacist

collaborative medication management service through a Benzodiazepine Outreach Clinic (BOC) at University of Colorado Anschutz Internal Medicine Clinic for patients with inappropriate benzodiazepine use. Based on National Institute for Health guidelines, we define inappropriate benzodiazepine use as: 1) “as needed” use for diagnoses other than insomnia, seizure disorder, or an acute anxiety; 2) scheduled use as monotherapy for anxiety disorders without documented evidence of failure to preferred, safer alternatives; and 3) suboptimal choice of benzodiazepine or dosing regimen. All patients are screened for inappropriate benzodiazepine prescriptions. The clinical pharmacy team includes an attending clinical pharmacist, medical students, and pharmacist interns and residents. This team recruits patients into the BOC using a phone script, assesses patients’ benzodiazepine use, and works collaboratively under protocols to optimize the safe and effective use of anxiety and insomnia medications. The protocols incorporate symptom assessments with validated scales, including the Generalized Anxiety Disorder-7 (GAD-7), Insomnia Severity Index (ISI) and Panic Disorder Severity Score (PDSS). All patients will receive education on non-pharmacological therapies and offered referrals to psychology and/or psychiatry. PCPs are updated on patients’ progress and any treatment questions or concerns will be managed collaboratively between PCP and clinical pharmacist. PCPs are educated directly through a one-time, formal, evidence-based review session guided by the treatment algorithms. They are educated indirectly through review of the BOC documentation in patient charts.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our primary outcome is the change in the percent of clinic patients with inappropriate benzodiazepine prescriptions. Secondary outcomes include: 1) Pre- and post- intervention patient symptoms measured with the GAD-7, ISI, and PDSS 2) post-intervention patient satisfaction surveys, 3) post-intervention PCP satisfaction surveys, 4) Pre- and post- intervention PCP knowledge measured with a knowledge test. We have conducted cognitive testing of the PCP satisfaction survey and knowledge test with PCPs in another internal medicine clinic associated with the same university. We will conduct process mapping at 6 months to improve BOC clinic processes.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Chart reviews of a random sample of patients found that 11 (21 %) of 52 patients taking benzodiazepines had received inappropriate prescriptions. In a feasibility and acceptability pilot of patient panels from 3 PCPs, 24 patients were eligible; of those 19 (79 %) were referred to the BOC clinic by their PCP. Of those referred, 14 patients (74 %) scheduled an appointment and 11 patients (58 %) completed their first appointment. Of patients who completed their first appointment, benzodiazepines were optimized in 3 (27 %) patients and benzodiazepine regimens were determined appropriate in 4 (36 %) patients. In the patients determined to be on appropriate regimens, the indication for benzodiazepine prescription had not been documented accurately. We had planned to transition phone recruitment to clinic staff during the pilot study. However, during the initial calls patients were frequently reluctant to discuss benzodiazepines. Thus, we decided clinicians needed to continue to make these calls with careful messaging.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): **Referral Tracking:** The pilot pointed to a need to track patients referred to the BOC clinic and repeat outreach to patients who scheduled but did not complete appointments. **Early stakeholder engagement:** Influential PCPs, one of UC-A’s clinical teams, UC-A’s scheduling team, and the hospital’s Pharmacy and Therapeutics Committee were engaged in the planning and development of the BOC clinic. **Pilot intervention:** Conducting a small-scale pilot led to clinic-wide acceptance of the BOC clinic. **Patient Messaging:** Careful messaging from the pharmacy team was essential to patient acceptance of this potentially sensitive clinical intervention. **Documentation:** The pilot finding of inaccurate documentation of indication for benzodiazepine prescription points to the importance of clinic processes to ensure accurate prescription information.

REDUCING READMISSIONS WHY PATIENT AND PROVIDER PERCEPTIONS MAY MATTER MORE THAN YOU THINK Jocelyn A. Carter²; Deborah Wexler²; Karen Donelan¹; Charlotte Ward²; Courtney L. Kaiser². ¹Massachusetts General Hospital, Lebanon, NH; ²Massachusetts General Hospital, Boston, MA. (Tracking ID #2200333)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Do patient and provider perceptions about inpatient care reveal how to prevent readmission within 30 days

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To identify perceptions of patients admitted to a single medical unit that are then readmitted within 30 days To identify perceptions of primary care/post-acute care providers of patients admitted to a single medical unit that are then readmitted within 30 days To analyze differences between and among patients admitted and readmitted

within 30 days with regard to demographic, clinical, socio-economic, and behavioral factors

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): A 20 item index questionnaire (administered to 533 inpatients on the day of discharge) and a 30 item readmission questionnaire (administered to 101 inpatients on the day of discharge) were developed by a team of survey experts as adapted from prior cognitively tested surveys. All patients included were admitted to a single medical unit in our academic center that admits ~1200 patients per year and is cared for by an internal medicine hospitalist paired with a nurse practitioner and two fourth year medical students. The index admission questionnaire included perceptions of physical and mental health, confidence in their own ability to take care of themselves outside the hospital, satisfaction with inpatient care received, likelihood to be readmitted in 30 days, understanding of care plan, basic demographic information (language preference, highest year of education and racial/ethnic identity) and whether or not patients have someone to help with their health at home. The readmission questionnaire included perceptions of why patients were being readmitted to the hospital (worsening of old symptoms, development of new symptoms, trouble getting a PCP or specialist appointment, trouble getting medications or taking medications, trouble with transportation, etc.), and the degree to which the understood the discharge plan. Index questionnaire participants were also asked if there was anything they could think of that would help them stay healthy outside the hospital. Readmission questionnaire participants were also asked about their living situation (living in their own home, with a roommate, staying with a friend, living with family, etc.), life changes (having to move or difficulty finding or keeping a job due to health issues, family stress, recent trauma or falls, worry about being alone or how to get help), financial difficulty (paying for medications, bills, food, shelter, etc.), degree to which assistance is needed to complete activities of daily living. Readmission questionnaire participants were also asked if they have someone to assist them with health care at home, if they need more assistance at home and what their biggest challenges were to staying healthy outside the hospital. A chart review was completed for all index and readmission questionnaire respondents and included basic demographics, reason for readmission, associated disease co-morbidities, as well as clinical and historical factors associated with admission or readmission. Focus groups of primary care clinic and post-acute care facility providers were completed for six hospital affiliated community clinics and eight commonly utilized post-acute care facilities, respectively. All chart reviews and surveys were entered into a REDCap database. Institutional Review Board approval was obtained

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1) Greater than 50 % response rate of patient index admission questionnaire 2) Greater than 50 % response rates of the patient readmission questionnaire 3) Completion of 100 % of provider focus groups at 6 community clinics and 8 commonly utilized post-acute care facilities

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): 1) Community clinic providers and post-acute care providers identified a lack of communication from hospital providers and unfavorable variation in the quality discharge summaries as a factor leading to increased readmission 2) Patients who rated their health as at least good were less likely to have a readmission (OR=0.62, $p=0.023$) 3) Patients who were very satisfied with their overall care that they received were less likely to have a readmission (OR=0.60, $p=0.027$) 4) Patients who said they were very likely to have a readmission were more likely to have a readmission (OR=1.98, $p=0.019$) 5) Responses from patients classified by their main clinical diagnoses during hospitalization (congestive heart failure, pneumonia, alcoholism, etc.) produced disease specific themes with regard to what would help them stay healthy outside the hospital.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1) Patient perceptions of health, satisfaction, and likelihood of readmission may predict rates of readmission 2) Provider perceptions may assist in discovering unidentified quality gaps 3) Clinical reasons for hospitalization may drive patterns of associated unmet patient needs related to readmission 4) Ongoing analysis of this data with implementation of interventions to address patient and provider identified quality gaps is underway 5) Additional studies are needed to confirm these results in other settings

SUCCESSFUL IMPLEMENTATION OF A CELLULITIS AND CUTANEOUS ABSCESS TREATMENT GUIDELINE AT AN ACADEMIC CENTER Keri Holmes-Maybank; John M. Hurst; Danielle Scheurer; Sean Boger. Medical University of South Carolina, Charleston, SC. (Tracking ID #2198961)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A recent study reviewing treatment of cellulitis and cutaneous abscess at an academic hospital revealed extensive overprescribing of antibiotics and excessive treatment duration which is of

particular relevance in light of the strong statements released by the Centers for Disease Control and Prevention, Infectious Diseases Society of America (IDSA), and World Health Organization regarding the critical threat of antibiotic resistance caused in part by the inappropriate use of antibiotics in treatment of infections including cellulitis and cutaneous abscess.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Create institution-specific clinical pathway, order set, and clinician education program for treatment of acute bacterial skin and skin structure infection (specifically cellulitis and cutaneous abscess). Improve antibiotic prescribing to increase compliance with clinical guidelines for cellulitis and cutaneous abscess. Decrease the length of antibiotic utilization for treatment of cellulitis and cutaneous abscess.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): An internist, Chief Quality Officer, and Antibiotic Stewardship Committee at an academic hospital collaborated to develop a guideline for treatment of adult inpatient cellulitis and cutaneous abscess based on recommendations from IDSA guidelines and the institution's antibiogram. For cellulitis with intact skin (uncomplicated), cefazolin was recommended for empiric therapy, with vancomycin reserved for cephalosporin allergy. For purulent (complicated) cellulitis or abscess >3 cm, empiric vancomycin was suggested. Source control was recommended for all cutaneous abscesses. Criteria were provided for de-escalation to oral therapy. The clinical guideline was presented at a mandatory resident conference in July 2013 to four general internal medicine teaching teams, each comprised of an internal medicine attending, upper level resident, and two interns, as well as two hospitalist services each with one internal medicine attending. For reference, the clinical order sets were made available to all practitioners on institutional computers, additionally internal medicine residents and attendings received a guideline pocket card. All interns, residents, and internal medicine attendings on a general internal medicine team or hospitalist service during July, August, and September 2013 received an email at the beginning of the month reminding them of the guidelines and resources for assistance with cellulitis and cutaneous abscess treatment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): A chart review of patients with confirmed cellulitis or cutaneous abscess on the general internal medicine and hospitalist services prior to implementation of the clinical guideline (January to March 2013) and post-implementation of the guideline (July to September 2013) was performed recording antibiotic selection, antibiotic days of therapy (DOT), and days to antibiotic de-escalation.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Chart review of patients ($n=50$) with confirmed cellulitis or cutaneous abscess prior to implementation of the clinical guideline revealed 74 % would have been compliant. Post-implementation review of patients ($n=31$) demonstrated 93.55 % compliance with antibiotic selection. There was a significant increase in the use of cefazolin, the recommended antibiotic for uncomplicated cellulitis (pre 4 %, post 19 %, $p=0.03$). There was a significant decrease in the utilization of the broad spectrum gram-negative agent piperacillin-tazobactam (pre 36 %, post 6 %, $p=0.002$). There were non-significant decreases in use of vancomycin (76 % of cases pre, 61 % post, $p=0.12$), linezolid (4 % pre, 0 % post, $p=0.49$), and cefepime (8 % pre, 6 % post, $p=0.59$). Total antibiotic DOT decreased significantly post-intervention (pre mean days 13.79, range 2–51, post mean days 8.58, range 3–14, $p=0.009$). Intravenous DOT were significantly decreased (pre mean days 7.88, range 0–51, post mean days 3.64, range 0–8, $p=0.07$). There was a significant increase in appropriate de-escalation of antibiotics after implementation of the guideline (pre 78 %, post 94 %, $p=0.05$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Implementation of an institution specific antibiotic guideline for treatment of cellulitis and cutaneous abscess with repeated education resulted in a significant increase in appropriate antibiotic utilization and de-escalation. Additionally, a significant decrease in inappropriate utilization of broad spectrum gram-negative antibiotics and duration of antibiotic exposure was observed. This was achieved by combining the efforts of the internists caring for the patients, the Antibiotic Stewardship Committee, and the hospital's Chief Quality Officer.

TEAM-BASED CARE IN TEACHING CLINICS: WHAT DO HIGH-FUNCTIONING TEAMS HAVE IN COMMON? Marianna Kong; Kate Dube; Rachel Willard-Grace; Thomas Bodenheimer; J. Nwando Olayiwola; Reena Gupta. UCSF Center for Excellence in Primary Care, San Francisco, CA. (Tracking ID #2199867)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Well-designed team-based care is an essential building block of high-functioning primary care, but is faced with unique challenges in residency practices.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): We sought to understand how team-based care is implemented in teaching practices, where the presence of many part-time providers and inconsistent scheduling are common challenges. By identifying themes of successful team-based care in teaching clinics, the goal was to disseminate best practices in delivering collaborative and sustainable primary care in teaching clinics.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We conducted site visits at sixteen primary care teaching clinics nationwide. Data was collected using a structured site visit guide and semi-structured interviews with clinic leadership, providers, trainees, and clinic staff. Site visit reports were coded and analyzed by two independent researchers using an iterative process, and the research team collaborated in identifying major themes in team-based care.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Not applicable

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Five major themes were identified as important to successful team-based care in the teaching clinics visited. Having small teamlets with providers and staff that consistently worked together was essential to creating care teams that were able to adapt well to day-to-day demands of functioning in clinic. A culture of empowerment of all team members was also important to truly share the care of a patient panel and allow each team member to perform at the maximum level of their training. Adequate staffing ratios to allow expanded team member roles, consistent team meetings and huddles for team/teamlet communication, and effective co-location were additional common elements in strong team-based care.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Despite obstacles faced by teaching practices in providing team based care, such as irregular provider schedules and staffing ratios, high functioning teams in teaching clinics were able to deliver effective team-based primary care by prioritizing a core set of themes. Understanding these themes may help other teaching practices improve their delivery of team-based primary care as well.

TESTING MEASURES FOR PHYSICIAN TIME AND TASKS IN AN ACADEMIC INTERNAL MEDICINE PRACTICE Matthew J. Moles; Carmen L. Lewis; Mary W. McCord; Huong M. Lam; Wagner Schorr-Ratzlaff; Laurence Williams. University of Colorado, Denver, CO. (Tracking ID #2191930)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Primary care is in a state of chaos with overburdened providers spending time doing non-clinical duties and working far outside of their clinical hours, with the upcoming incorporation of population management that will lead to additional demands on provider time.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Objective 1: Identify feasible measures of providers' time spent on care and task Objective 2: Accurately measure providers' time spent working on specific tasks Objective 3: Expand measurement to staff

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The University of Colorado is actively working on changing the structure of their outpatient primary care clinics to be able to provide the care that is necessary in a pay-for-performance system and accommodates new demands related to population management. Currently, providers are asked to do the majority of direct patient care and care-coordination. In order to have a better idea of the current workload and to facilitate a better allocation of resources in the redesign of the primary care clinics, we attempted to quantify the time spent on activities by providers. The project was carried out at two large academic outpatient internal medicine practices. The practices were comprised of physicians and mid-levels working in a traditional fee-for-service model. They were supported by registered nurses and medical assistants performing in a traditional model of care. Patients were primarily insured. All clinical documentation was performed on an electronic medical record. Four PDSA cycles were conducted over the course of project. Before commencement we determined a list of tasks that were to be measured. PDSA cycle one used reports within the electronic medical record to look at the number in-basket tasks generated on a monthly basis for five internal medicine teams composed of physicians, registered nurses, and medical assistants. Tasks were compiled and analyzed based on subject matter. PDSA cycle two evaluated the time spent by providers during normal business hours by way of direct observation, sorting time based on predefined categories. Providers were observed during half day clinic sessions averaging 3.5 h with manual counting and time analysis of their activities. PDSA

cycle three involved provider reported time, utilizing Toggl, a manual counting and timing application for the computer and smart-phone. Five providers were asked to record their time spent on performing predetermined activities throughout each day. PDSA cycle four utilized a provider survey through email asking how much time was spent before, during, and after clinic on the electronic medical record performing patient care and care-coordination tasks per half day clinic sessions.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Tasks were measured by count and time and grouped into the following categories: patient visit, documentation, in basket, in basket - triage, in basket—results, in basket—other, email/Outlook, paperwork, preparing for the patient visit, and work outside of clinic.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Overall, providers spent 51 % of their time performing direct patient care and 41 % of their time on electronic medical record based documentation and in basket tasks. The remainder of the time was spent on email/outlook and paperwork. Per each 3.5 h clinical session, providers spent 2:09 h:min measured by direct observation and 3:21 h:min measured by physician input into Toggl on direct patient care. Providers also spent a significant amount of time performing documentation and in basket tasks. Utilizing Toggl, this amounted to 1:12 h:min and 1:31 h:min respectively. This was similar to what providers reported in the email survey, with the average time spent documenting of 1:48 h:min. This shows that for each 3.5 h clinical session, providers are performing approximately 2.5–3 h of additional time after direct patient care is over.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1. Providers spend a significant amount of time outside of direct patient care performing in basket tasks and documentation. This time occurs outside of normal business hours or designated clinical time. 2. Determining provider utilization of time requires concrete fields of measurement. 3. Long term scalability of measurement is best performed via direct observation and provider email. 4. Significant task redistribution will be necessary to facilitate population management and prevent provider burnout during the transition to a pay-for-performance model of care.

THE IMPACT OF OPEN ACCESS SCHEDULING ON INTERNAL MEDICINE RESIDENT-PATIENT CONTINUITY Shilpa M. Shah¹; Ryan Laponis²; Radhika A. Ramanan¹; Katherine Julian¹. ¹UCSF, San Francisco, CA; ²University of California San Francisco, San Francisco, CA. (Tracking ID #2198793)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In an effort to provide access to timely and well-coordinated primary care, many practices have become certified as patient-centered medical homes (PCMH). One requirement for certification is open access scheduling, in which appointment slots are reserved for same-day or same-week patient access however little is known about the effect of open access scheduling on a resident continuity practice.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Given the positive associations between patient continuity, resident satisfaction and patient outcomes, we sought to understand how open-access scheduling impacts patient continuity in a resident clinic. We examined patient continuity with their primary care provider before and after implementation of open-access scheduling in an internal medicine resident continuity clinic practice.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Resident physicians at the University of California, San Francisco (UCSF) participate in a 50/50 block model, alternating 2 months of inpatient rotations with 2 months of outpatient rotations. The Mt. Zion General Medicine Clinic is a mixed faculty-resident practice at UCSF, which is the continuity clinic site for between 21 and 24 internal medicine residents per class. Prior to October 2013, appointments were scheduled based solely on provider availability. In October 2013, open access scheduling was implemented for all providers. For residents, open access scheduling was limited to their outpatient blocks where, for each clinic session, one out of six appointment slots was reserved for same-week access.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We examined patient continuity among second- and third-year residents at the Mt. Zion General Medicine clinic from October 2012 to March 2013 (FY13) as compared to October 2013 to March 2014 (FY14). First, we identified all appointments between residents and patients established in the practice including, but not limited to, their own primary care patients (FY13 n=3247, FY14 n=3218). Next, we identified all appointments that the primary care patients of residents had with any provider including, but not limited to, their own primary care provider (FY13 n=2457,

FY14 $n=2647$). We then assessed continuity using two methods: (1) the continuity physician method, which reflects the percentage of appointments during which providers see their own patients and (2) the usual provider method, which reflects the percentage of appointments during which patients see their own provider.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Using the continuity physician method, continuity among second-year residents increased from 59 to 60 % ($p=0.65$) following implementation of open access scheduling. Among third-year residents, continuity increased from 58 to 67 % ($p<0.05$) using this same method. Using the usual provider method, continuity among second-year residents increased from 76 to 81 % ($p<0.05$) with open access scheduling while in third-year resident providers, continuity decreased from 77 to 73 % ($p<0.05$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Implementation of open-access scheduling was associated with increased resident-patient continuity by the continuity physician method. The improved continuity was most substantial for third-year residents, which may reflect their larger panel size despite having the same appointment template as second-year residents. The decrease in resident-patient continuity among third-year residents following open access scheduling using the usual provider method may reflect patients' improved access to timely care with available providers when resident providers are unavailable. Next steps include investigating the specific drivers behind these changes in continuity, which may allow the design of a resident clinical experience that optimizes resident-patient continuity.

THE INTENSIVE OUTPATIENT CLINIC: TARGETING SUPER-UTILIZERS AT DENVER HEALTH Holly A. Batal; Vishnu Kulasekaran; Jeremy Long; Michael J. Durfee; Rachel Everhart; Daniel Brewer; Mary vander Heijde; Deborah Rinehart; Carlos Irwin Oronce; Kathy Thompson; Diana Botton; Tracy L. Johnson. Denver Health, Denver, CO. (Tracking ID #2193905)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): High risk patients, or super-utilizers, utilize a disproportionately large amount of health care resources and cost and represents an important area of focus for optimal resource allocation.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Improve population health by 5 % 2. Improve between-visit patient satisfaction by 5 % 3. Decrease total cost of care by 2.5 % relative to trend

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In 2012, Denver Health received a Center for Medicare and Medicaid Innovation grant to implement a "21st Century Care" program, aimed at reducing costs and improving patient outcomes. This multifaceted program involves numerous components of system and care re-design to address the utilization of high-risk patients, among other interventions. One primary intervention targeting adult "very high-risk" patients, or super-utilizers, is the Intensive Outpatient Clinic (IOC). The IOC is a primary care clinic based within an integrated health system, Denver Health. It is modeled as an ambulatory ICU to draw on super-utilizing patients who suffer from no source of primary care or who are beyond the reach of typical primary care scope within Denver Health's community health center system. The clinic offers longer appointments, a robustly-staffed interdisciplinary team, easy access, and interfaces with mental health systems, hospital medicine teams, and primary care. The clinic benefits from longer appointment times for patients and the ability to provide higher intensity and more care for patients suffering from the overlay of chronic disease, substance abuse, mental health disorders, chronic pain, and homelessness.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The IOC is guided by a strong analytical team who guides evaluation efforts and supports the clinic as it gains a database of experience in caring for super-utilizers. This team is focused on numerous outcomes for high risk patients across the Denver Health system. Financial metrics, such as cost aversion and total charges, have been tracked to determine program impact. A historical cohort model will offer the opportunity to compare high risk populations before and after interventions occurred within the context of the 21st Century Care grant.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Under the tiering strategy used to identify high risk adult patients, a cohort of 300+ patients has been enrolled in the IOC. Another 400+ patients have been excluded according to pre-determined criteria. The utilization of all high-risk adult patients at Denver Health has been examined. An actuarial analysis confirmed that baseline Medicaid per member per month (PMPM) costs increase by risk strata: Tier 1 (\$343.71 PMPM); Tier 2 (\$814.05 PMPM); Tier 3 (\$2887.07 PMPM); Tier 4 (\$7741.93 PMPM). Preliminary actuarial findings based on the first 11 months of program data estimated a 2.7 % overall reduction in Medicaid spending—driven primarily by a 6.1 % reduction in Tier 4 spending—relative to the prior (baseline) year's spending, adjusted for inflation.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The IOC was developed based upon criteria determined by the 21st Century Care team and available resources within Denver Health. It would not function in nearly the same capacity without the guidance and support of this team, which offers analytical, programmatic, and policy support. An integrated health system, with substantial inpatient and outpatient services, lends itself to creation of an ambulatory ICU model for delivering care to super-utilizers. This model is different in theory and practice from alternative models which "HotSpot" patients and focus more on identification and direction of patients than on re-designing their care model. Financial impact can be demonstrated according to measures that offer the ability to examine current patients with regard to a historical cohort.

THE MOBILE INSULIN TITRATION INTERVENTION (MITI) STUDY: INNOVATIVE CHRONIC DISEASE MANAGEMENT OF DIABETES Natalie K. Levy¹; Victoria Moynihan⁸; Annielyn Nilo⁶; Karyn Singer⁴; Mary-Ann Etiebet⁵; Lidia Bernik⁷; James H. Cho¹; Yixin Fang²; Sundar Natarajan³. ¹NYU School of Medicine, Bellevue Hospital, New York, NY; ²New York University, New York, NY; ³VA New York Harbor Healthcare System, New York City, NY; ⁴Urban Health Plan, New York, NY; ⁵HHC, New York, NY; ⁶Bellevue Hospital, New York, NY; ⁷Mount Sinai Health System, New York, NY; ⁸NYU School of Medicine, New York, NY. (Tracking ID #2180410)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can a 12 week program using text messaging and phone calls be used to adjust Lantus doses for type 2 insulin dependent diabetic patients of the Bellevue medical clinic?

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): In addition to evaluating the % of patients that reach their optimal Lantus dose in each arm, the MITI Study evaluates: 1. The feasibility of this type of study in a public hospital's outpatient medical clinic 2. If the intervention saves time and money 3. Patient satisfaction

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Remote Lantus insulin adjustment is appealing at a busy outpatient medicine clinic where appointment access can be limited and appealing to the low-income patients served by our hospital who often have to miss hours of work, make arrangements for the children in their care, and arrange transportation in order to come for an in-person clinic appointment. English or Spanish speaking patients in Bellevue's outpatient medical clinic who need their Lantus dose adjusted are randomized to two arms- the MITI intervention and usual care. MITI patients are enrolled in a secure web platform that texts them each weekday morning asking them to text back their fasting blood glucose. The MITI diabetes nurse reviews these numbers for alarm values daily. Each Thursday, the MITI diabetes nurse consults the (pre specified, MITI physician created) adjustment algorithms and calls patients advising them on Lantus dose titration. (When the diabetes nurse was unavailable on any given day of the study, the PI or co-investigator reviewed for alarm values or made titration phone calls.) This process continues until the patients reach their optimal Lantus dose (defined as the Lantus dose that achieves one fasting blood glucose value less than or equal to 130, or the maximal dose of Lantus that can be safely given). Patients in the usual care group continue to come to in-person titration visits in the manner specified by their primary medical doctor.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our study measures four main areas 1) Clinical Effectiveness: The number of patients in each arm (MITI vs. usual care) that reach their optimal Lantus dose in 12 weeks. 2) Feasibility: The % of text message responses, the ability of the MITI nurse to reach patients via phone calls, and the volume of time spent by the MITI nurse. 3) Cost savings: The time saved by patients in the MITI arm is measured by the usual travel time to and from clinic, the time spent in the waiting room prior to each appointment, and the co-pays that accompany in person visits. 4) Satisfaction: Patient satisfaction is measured using the validated Diabetes Treatment Satisfaction Questionnaire at baseline and at 12 weeks.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We had a pilot grant for 2013 and again for 2014. Each pilot grant allowed about 6 months of the active intervention which allowed us to enroll patients and follow them for 12 weeks. In 2013, 27 eligible patients enrolled in the MITI Study, 13 in the MITI arm and 14 in usual care: Clinical outcome: All 13 MITI patients reached their optimal Lantus dose within 12 weeks, while only 5 usual care patients reached their optimal Lantus dose (100 vs. 35.7 %, $p<0.001$). Feasibility outcome: 82.7 % of our text messages were returned by patients. The nurse was able to reach patients with a single phone call 54 % of the time, spent an average of <5 min a day checking for alarm values, and spent an average of only 15 min on titration phone calls on Thursdays. Cost savings: Patients saved an average of 45 min of transportation time to and from the clinic, saved a \$15 co-pay for

each visit, and the duration of the titration interaction was much shorter in the MITI arm (6 vs. 30 min for in-person visit). The waiting room time was not measured in 2013 but is being measured in 2014. There was no increased utilization of Bellevue ER, walk-in, or med refill visits for the MITI arm patients. **Satisfaction:** The 12 week Diabetes Treatment Satisfaction Questionnaire showed that MITI patients reported higher satisfaction ($p = 0.03$) **Other:** There were 8 cases of mild hypoglycemia (5 MITI, 3 in Usual Care, BG 60–79). There was no increased use of Bellevue Hospital services in the MITI arm. The analysis of the 2014 data is ongoing. Enrollment ended 12/12/14 and 12 week data collection for these 2014 patients will end in March 2015. [Thus far we can report that 14 of 15 2014 MITI patients reached their optimal Lantus dose (within the 12 weeks of the trial). The 15th patient is still within her 12 weeks. Feasibility, Cost saving, and Satisfaction data will follow]

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Remote Lantus adjustment is effective, feasible, cost saving and satisfactory. Lantus can be adjusted remotely using basic cell phone technology and a low cost web platform in the medical clinic of a large public hospital. This intervention helps ease the burden on demand for access in a busy clinic, and provides patient centered care for low-income diabetic patients who have challenges coming to in-person appointments.

TOWARDS THE DEVELOPMENT OF PATIENT-CENTERED DISCHARGE SUMMARIES Karen Okrainec; Shoshana Hahn-Goldberg; Tai Huynh; Nina Zahar; Howard Abrams. University Health Network, Toronto, ON, Canada. (Tracking ID #2200041)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Despite discharge from hospital being a vulnerable transition for patients, many health-care institutions do not use patient-centered discharge summaries which are written in a way that is easy for patients to understand or act on.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To design a discharge summary for inpatients which can complement the current discharge process with information most relevant and actionable for patients, presented in an easily understandable and usable form.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Our group at OpenLab, along with the Toronto Central Local Health Integration Network, set out to engage patients, caregivers and providers to understand the patient experience at discharge and to redesign the way in which information is communicated into a Patient Oriented Discharge Summary (PODS). Our group worked with over 56 patients and caregivers, 30 health-care personnel, 7 patient education professionals and 8 designers in Toronto, Ontario to design a PODS based on best practices in information design, graphic design and patient education. Our mixed-methods involved patients and caregivers throughout the project, mostly on the Internal Medicine inpatient ward, including observations, interviews, surveys, focus groups, cultural probes, process and experience mapping. While no specific inclusion or exclusion criteria were used, deliberate efforts were made to engage harder to reach patients such as those with limited health literacy and language barriers and those with mental health issues.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Early pilot data to test usability and feasibility of the PODS included 1) using focus groups with Cantonese speaking patients and patients with mental health issues, 2) an online discussion with a virtual patient and caregiver panel, and 3) a usability test of a paper-based version of the PODS across 3 different hospital sites. Questions of usability and feasibility centered around: staff time needed to fill out and administer the PODS, usefulness, ease of reading and understanding of the information presented, and open-ended qualitative questions on favorite things about the summary, missing information they would like, and anything they would change. Currently, the newly updated PODS is being adopted and implemented across 8 health-care institutions across the city. Measures of success will include usability and feasibility, patient experience (patient satisfaction and patient understanding and adherence to discharge instructions using Transitional Care Model 3 validated questions) and secondary health outcomes (30 day unscheduled ER visits and readmissions). The primary outcome will be the demonstration of feasibility of adapting PODS into the discharge process of institutions with differing discharge workflows as measured by 75 % of pilot sites utilizing the PODS at 12 months.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Essential elements to communicate at discharge were: (1) Medication instructions, (2) How I can expect to feel, danger signals, and what to do, (3) When to resume activities and other lifestyle changes, (4) Follow up appointments including phone numbers, (5) Resources and pointers to information. The prototype PODS reflects these essential elements. White space is included on the margin for patients to jot down their

own notes, which has been found to improve information retention and recall. The results of the pilot data showed that patients would benefit from using the PODS. 94.8 % of patients and 75 % of providers said that the PODS would be helpful to have when discharged from hospital. Patients rated a sample PODS as either “good” or “very good” in terms of both the accessibility of the PODS and how easy the PODS was to read and understand. Suggestions for improvement included recommendations for changes to visual elements and language used in the PODS. Usability scores from providers were reasonably high, with an average value of 78 % for the paper prototype. The biggest recommendation from providers was to create an electronic version. Providers noted that the PODS was most useful for patients with multiple comorbidities, new diagnoses, a lot of required follow up, and limited health literacy.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Current discharge summaries are designed for the provider, not for patients, and are not well suited for use as tools to support communication. Given the amount of research and feedback incorporated in the design of PODS, we recommend that hospitals use the PODS and refine it over time. For hospitals that would like to create their own, they are encouraged to not start from scratch, but to learn from what this project has already uncovered. We have taken these lessons and packaged them into a set of guidelines for the content that should be included in a PODS, the design of PODS to make it accessible and usable for patients, and the process of delivering the PODS to the patient. These guidelines have been summarized in a single tip sheet.

TRANSITION FROM PEDIATRIC TO ADULT HEALTH CARE BASED ON THE ACP/AAFP/AAP HEALTH CARE TRANSITION CLINICAL REPORT AND THE SIX CORE ELEMENTS OF TRANSITION Patience H. White²; April Barbour¹. ¹George Washington University, Washington, DC; ²George Washington University, Bethesda, MD. (Tracking ID #2197651)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): An estimated 18 million adolescents ages 18–21, about 1/4 of whom have chronic conditions, will need to change from pediatric to adult approach to care and although much has been written about effective approaches for transition from hospital to home, little has been published about effective quality improvement interventions from pediatric to adult health care.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): To examine improvements in transition from pediatric to adult health care involving pediatric and adult primary care practices using the “Six Core Elements of Health Care Transition,” a quality improvement intervention modeled after the American Academy of Pediatrics/American Academy of Family Physicians/American College of Physicians Clinical Report on Transition.⁽¹⁾ 1. American Academy of Pediatrics, American Academy of Family Physicians, and American College of Physicians, Transitions Clinical Report Authoring Group. Supporting the health care transition from adolescence to adulthood in the medical home. Pediatrics 2011;128:182e200.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): A time-series comparative study of changes in 5 large academic primary care outpatient pediatric and adult practice teams of internists, family medicine and pediatricians that also included nurses, family navigators, social workers, and youth in the District of Columbia participating in a 2-year transition learning collaborative. The Learning collaborative methodology utilized was developed by NICHQ and pioneered by the Institute for Healthcare Improvement.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The Health Care Transition Index, modeled after the Medical Home Index developed by Center for Medical Home Improvement, was used to assess progress in implementing the Six Core Elements of Transition, which include development of an office transition policy, provider knowledge and skills related to transition, identification of transitioning young adults, transition Readiness/orientation to adult practice, transition planning/integration into adult practice, and transfer of care/initial adult provider visit.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): There were improvements in all of the transition quality indicators in the pediatric and adult practices that participated in a health care transition learning collaborative. All sites established a practice-wide policy on transition and utilized an organized clinical process for documenting the youth's progress through the transition to an adult provider. Pediatric sites performed transition readiness assessments with 88 % of eligible youth, and 29 % prepared transition plans. Adult sites conducted transition readiness assessments with 73 % of eligible young adults, and 33 % had care plans developed. A total of 50 were transferred in a systematic way to adult primary care practices over the project period, the majority in the last 6 months of the learning collaborative, after the QI processes were in place at the pediatric and adult sites.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Quality improvement approach utilizing the Six Core Elements of Health Care Transition resulted in the development of a systematic clinical transition process in pediatric and adult academic primary care practices. The practices found the ready made customizable tools easy to use, improved the transition process and were sustainable. Involvement of all stakeholders including key leadership from the beginning along with consumers was essential. Internal medicine physicians developed appreciation for and developed ways to incorporate young adults into their practice as a special population. Improvements in the 6 core elements were suggested and completed. Electronic health record customization and financial incentive are hurdles that need further work.

UNDERSTANDING IMPORTANCE THROUGH PAPERWORK Heidi Vrolijk¹; Julie L. Mitchell². ¹Medical College of Wisconsin, Wauwatosa, WI; ²Medical College of Wisconsin, Milwaukee, WI. (Tracking ID #2199295)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Patient- or agency-initiated forms, hereafter referred to as paperwork, occupy staff time, often frustrate providers, and dissatisfy patients when not completed in a timely fashion.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): 1. Describe patient, provider, and clinic staff expectations about paperwork. 2. Compare the data between what patients want and what physicians and staff think patients want. 3. Develop a process to meet the goal turn-around-time for paperwork

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We surveyed primary care patients, physicians, and staff about clinic paperwork anonymously using a convenience sample ($N=65$). Survey domains included preferred turn-around-time and importance of timely completion regarding paperwork for durable medical equipment (DME) orders, home health plans of care (POC), and medication prior authorizations (PA). We created a value-stream map of our current process for paperwork using Lean systems engineering principles. We eliminated inefficient and ineffective steps and reformulated the process so that each step was handled by a staff member working at the top of his or her license.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Paperwork turn-around-time (TAT)

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): On average, patients expect the following turn-around-times: 7.6 days for DME, 6.8 days for POC, and 5.7 days for PA. They rated all three as "somewhat important." Physicians and staff expect the following turn-around-times: 6.2 days for DME, 7.9 days for POC, and 4.3 days for PA. They rated DME and POC as "somewhat important" and PA as "very important." Physicians and staff expected patients to desire a 3.2 day TAT for DME, a 3.9 day TAT for POC, and a 1.9 day TAT for PA. They also expected patients to rate all the forms as "very important." The clinic's paperwork process went from 29 to 15 steps and went from hitting the goal TAT 50 % of the time to hitting it 97 % of the time.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Patients' understanding of processing paperwork requests is limited. Physicians and staff were unable to predict patient expectations possibly biased by negative anecdotal experiences with patients' concerns. Patients who had experienced delays in their paperwork being processed were dissatisfied at the time of the event, yet set low expectations for paperwork TAT when surveyed. Our original paperwork process was clumsy and ineffective, primarily because it was a job no one wanted to do: staff found it tedious, not rewarding (little direct patient contact), and an "add-on" to their usual work based in the EHR. Systems engineering principles helped us improve efficiencies and staff input was key. Our next steps include patient education to set realistic expectations and continuing to lower our turn-around-time.

USE OF A DATA DRIVEN MULTIDISCIPLINARY TEAM TO REDUCE READMISSIONS FOR HIGH RISK MEDICAID PATIENTS IN AN ACADEMIC MEDICAL PRACTICE Jennifer Verbsky²; Janet R. Zolli²; Daniel J. Coletti⁶; JoAnne Gottridge¹; Joseph Conigliaro⁴; Maansi D. Amin³. ¹Hofstra North Shore LIJ School of Medicine, Great Neck, NY; ²Hofstra-NS/LIJ School of Medicine, North Shore University Hospital, Great Neck, NY; ³North Shore LIJ Health System, Dix Hills, NY; ⁴North Shore LIJ Health System, New Hyde Park, NY; ⁵North Shore LIJ Health System, Great Neck, NY; ⁶The Zucker Hillside Hospital, Glen Oaks, NY. (Tracking ID #2196739)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A small subset of Medicaid-insured patients cared for by the faculty and residents of the Division of General Internal Medicine of the North Shore Long Island Jewish Health System were

responsible for the majority of hospital readmissions and we sought to determine if a multimodal team approach could decrease hospitalizations for these high-risk utilizers.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): The main objective of our innovation was to decrease the re-hospitalization rate for our Medicaid patient population. Additionally, we sought to build a multidisciplinary team to improve the efficient and effective use of available resources for the most medically and psychosocially complex patients in our practice. Finally, we wanted to educate our internal medicine resident physicians about transitions of care procedures and PCMH principles.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We developed a Hospital to Medical Home Project at the North Shore University General Internal Medicine Clinic, a large ambulatory medicine resident and faculty practice with 15 full-time faculty and 75 resident physicians. Both practices combined accommodate 32,000 visits each year from an ethnically and socioeconomically diverse urban/suburban patient population. Prior to the initiation of our project, we developed four major innovations that were all integral components of the project. First, we formed a multidisciplinary Hospital Medical Home Project Team comprised of medical providers, behavioral health specialists, patient educators, case managers, and secretarial staff. Each team member had a well-defined role and brought their individual expertise and experience to the team. Second, we developed a multifaceted communication infrastructure where communication among team members occurred both formally and informally, on daily, weekly, and monthly schedules, encouraging all members of the team to work together as a cohesive unit. Third, we implemented several IT enhancements including electronic notification of patient hospitalizations or emergency room visits, and note templates in the electronic medical record that standardized post-discharge documentation and provided decision support. Fourth, we conducted multiple PDSA (Plan, Do, Study, Act) cycles with continuous data collection, analysis, reflection, and subsequent change to improve the process. Project implementation began with the creation of a structured process for enrolling patients in the project after a hospital discharge, and a stratification system to define "high-risk" Medicaid patients based on number of hospital encounters, medical and psychiatric conditions. Administrative staff reviewed daily electronic notifications of patient hospitalizations and developed a patient hospitalization registry. The registry was then reviewed to identify patients who met "high-risk" criteria for entry into the program. Each "high-risk" patient was contacted within 48 h of discharge to set up a post-discharge office visit with a nurse practitioner and a nurse care manager. After the initial post-discharge office visit, patients were presented at a weekly interdisciplinary Team Meeting and assessed using a sub-stratification protocol to identify and prioritize patient needs, facilitate staff resource allocation, and formulate individualized care plans. Subsequent patient visits occurred with the nurse practitioner as well as other team members to review and simplify medication regimens, address behavioral issues and medication compliance, provide patient education, and discuss goals of care. Biomarkers of patient health status, patterns of adherence to treatment, and healthcare utilization (including re-hospitalizations) were tracked continuously. After "high-risk" patients were deemed stable, they were transitioned back to the resident physician to assume the role of primary care provider. Residents were educated on the project mission, available resources, and participated in weekly interdisciplinary meetings.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Hospitalization rates and 30-day readmission rates are used to measure project success. We also plan to use qualitative data from surveys and focus groups to assess resident education.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The unadjusted all-cause 30-day readmission rates for all Medicaid-insured patients in our practice dropped from 35 % in 2012 (baseline) to 16 % in 2013 and to 13 % by the third quarter of 2014. As of November 1st, 39 of the 121 (32.2 %) patients enrolled in the project had been managed without re-hospitalization for over 12 months, 69 (57 %) remained out of the hospital for at least 6 months, and 85 (70.2 %) for at least 3 months. All cause 30-day re-hospitalization rates for the patients enrolled in the project declined from a rate of 3.19/1000 patient days to 0.94/1000 patient days during the third quarter of 2014.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Hospital readmissions can be successfully reduced with the use of an ambulatory multidisciplinary care team that provides enhanced outpatient resources for high-risk hospital utilizers. Data analysis plays an integral role by stimulating continued improvements.

USING GROUP MEDICAL VISITS AND A NOVEL WEBSITE TO HELP DIVERSE OLDER ADULTS ENGAGE IN ADVANCE CARE PLANNING IN PRIMARY CARE Emily Wistar¹; Carly S. Benner²; Claire K. Horton¹; Rebecca L. Sudore¹. ¹University of California at San Francisco, San Francisco, CA; ²University of California, San Francisco, San Francisco, CA. (Tracking ID #2198644)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): With the aging United States population facing increasingly complex medical decisions, advance care planning (ACP) is becoming ever more important for patients and their families; however, primary care providers in busy office practices often do not have the time or resources to discuss ACP, especially for diverse older adults with low health literacy and multiple chronic conditions.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): Group medical visits (GMV) have shown promise as a means to efficiently provide health education to patients for a variety of conditions, such as diabetes. However, little is known about the feasibility of using GMV for ACP in the primary care setting. In addition, although preliminary studies show that the ACP website called PREPARE (prepareforyourcare.org) helps diverse older adults engage in ACP, it has not yet been studied in GMV. Therefore, the goal of this residency based quality improvement (QI) program was to determine the feasibility of GMV for ACP that utilize the PREPARE website.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We conducted a pre-post pilot QI GMV program among English-speaking primary care patients who were ≥ 55 years of age and had ≥ 2 chronic medical conditions. Participants were recruited from two primary care clinics in an urban safety net setting in Northern California through study fliers and recruitment phone calls. Participants attended two 90-min GMV, during which they were shown informational videos from the PREPARE website about choosing a medical decision maker, deciding what matters most in life, choosing flexibility for a surrogate decision maker, telling others about their wishes, and asking doctors appropriate questions. Participants were also given booklets corresponding to the video content, and an easy-to-read advance directive. We targeted 5–10 participants per group.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We assessed pre-to-post ACP knowledge (percent answered correctly) and whether participants designated a surrogate decision maker or completed an advance directive using Fisher's exact tests. We also assessed ease-of-use of program materials (1–10 point scale).

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We conducted two GMVs with 8 and 9 participants, respectively. The mean age of participants was 62 years (± 8.5). Forty-four percent were women, 67 % were non-white, 55 % had less than a high school education, 44 % rated their health as fair-to-poor, and 33 % had limited health literacy. Preliminary findings show that the group visits improved patient knowledge about ACP. Specifically, knowledge about designating a surrogate decision maker improved from 44.4 % correct pre GMV to 85.7 % post GMV (p -value 0.09) and knowledge about how to inform others of their decisions also improved significantly (55.6 vs 100 %, p -value 0.04). The percentage of participants who identified a surrogate decision maker increased pre to post GMV (44 vs. 86 %, $p=0.09$), as did the percentage that had plans to complete an advance directive in the next 30 days (11 vs. 29 %, $P=0.37$). Participants rated the GMV and PREPARE materials a mean of 8 (± 3.1) on a 10 point ease-of-use scale.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): It is feasible to conduct GMV for ACP using the PREPARE website. GMV and PREPARE were rated highly, improved ACP knowledge, and may be efficient ACP tools in the primary care setting.

USING PATIENT NARRATIVES TO IDENTIFY CLINICAL AND SOCIAL DRIVERS OF HIGH EMERGENCY DEPARTMENT (ED) UTILIZATION AMONG COMPLEX, HIGH-RISK PATIENTS Sonia Panigrahy²; Winnie Wang³; Carly Hudelson⁴; Yamini Saravanan¹. ¹Cambridge Health Alliance, Cambridge, MA; ²Sonia Panigrahy Consulting, New York, NY; ³Harvard School of Public Health, Boston, MA; ⁴Harvard Medical School, Boston, MA. (Tracking ID #2200103)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Five percent of the population account for approximately 50 % of total healthcare costs. The healthcare industry is responding to this disproportionate utilization, concentrated among patients with multiple conditions and social needs, by moving towards team-based chronic care management models, such as Complex Care Management (CCM). There is a paucity of work to engage high utilizing patients to identify their own needs, collaborate with providers to design care plans that integrate clinical problems with social determinants, and consequently develop aligned care goals for better health outcomes. This small pilot uses narrative methodology to understand the healthcare and social needs of this very complex, and misunderstood population so to design patient-centered care.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): This innovation uses a narrative methodology to collect patient stories from complex care patients to : (1) understand these patients in a more humanistic manner; (2) understand the reasons for high ED utilization and (3) identify the healthcare needs of this vulnerable patient population.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The Cambridge Health Alliance (CHA) is the only public health system in Massachusetts and is a safety-net academic health center for vulnerable populations. Approximately 25 CHA patients, covered under a Medicaid subsidy, were identified as over-utilizers. The project team was able to outreach 12 of these patients, and using narrative methodology interviewed them for 70–90 min. The interviews were semi-structured with 8 standard open-ended questions that were audio-recorded, transcribed, coded, and analyzed in Dedoose. These transcripts are written up as patient stories and will be shared with both the patient, and their PCPs.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): This pilot process aims to standardize a method for collecting a patient-centered assessment of health and social needs to provide the care team humanizing contextual clues that drive patients' behavior.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Preliminary analysis show that a majority of these patients report unstable childhoods, current financial stressors, social isolation, and a personal history of sexual trauma. All patients described healthier periods in their lives as times when they were more financially stable, felt safe, and had more of a social community. With respect to ED use, the main theme is a self-perceived sense of urgency of chronic symptoms exacerbated by social isolation. All 12 patients also felt very stigmatized for their ED use.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): This small pilot adds evidence that health is determined by social drivers, and any healthcare intervention to decrease utilization and improve health outcomes will also have to influence social drivers. A first step is to standardize a process by which the healthcare team can fully understand the patient as a person. We propose that using a narrative patient story will be both humanizing and therapeutic. This exploratory process could lay the groundwork for the creation of a streamlined process within chronic care management (CCM) to co-design care with their other high-risk patients. Utilizing narrative methodology can increase the success of CCM as determined by systems outcomes (i.e. health, utilization, and cost) by first improving upon patient-determined outcomes based on the understanding of the needs of this population.

WORKING TO REDUCE ADVERSE EVENTS IN PATIENTS THAT ARE "HANDED OFF" Natasha Cuk²; Sun Yoo²; Rachel Brook³; Neveen S. El-Farra²; Neil Wenger³; Nimesh Patel³; Teryl Nuckols¹. ¹Cedars-Sinai, Los Angeles, CA; ²David Geffen School of Medicine at UCLA, Los Angeles, CA; ³University of California, Los Angeles, Los Angeles, CA. (Tracking ID #2199788)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Handoffs have been shown to result in a substantial number of adverse patient care events (i.e. medical errors leading to patient injury and care delay) especially among trainees; although standardized signout protocols have been demonstrated to decrease handoff errors, there has been limited literature on the effectiveness of these interventions due to the increased transitions of care created by the 16 h work day duty hour restrictions, particularly those of night admitting teams to primary accepting teams.

OBJECTIVES OF PROGRAM/INTERVENTION (NO MORE THAN THREE OBJECTIVES): At Ronald Reagan UCLA Medical Center (RRUCLA), close to 50 % of admissions are handled by a housestaff night admitting team and then "handed off" to accepting primary medicine teams in the morning. Currently, the night admitting team admits all patients between 7 PM and 7 AM, which are then distributed to the various "on call" medicine teams the following day. Some of these admissions (depending on the time they are admitted) may involve double signouts. The objective of this study was to examine and compare the adverse event rates among handoff patients to those that are directly admitted by the primary team (de-novo admissions) Our hypothesis was that handoff patients will have a higher incidence of adverse events than patients admitted directly by the primary team. An additional objective was to examine the adverse event rate in the current admissions system in order to compare it to the rate of adverse events after an intervention.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We collected daily data from all residents on General Medicine Inpatient Wards from 11/13/14 to 12/12/14 at RRUCLA. Each ward

resident received an email on their post-call days with an individualized survey for all admissions using REDCap software. Residents were prompted to identify the type of admission (e.g. handoff or de novo), followed by any adverse events that may have occurred. If an adverse event was observed, residents were further asked to categorize the event and also write a brief narrative, in order to identify any contributing factors or potential areas for intervention. Finally, residents were asked to rate the harm associated with the event (a Likert Scale). Residents were given up to 2 weeks after the conclusion of a 4-week period on inpatient wards to complete the surveys. Residents who completed at least 80 % of the surveys received a 50 dollar gift certificate. The acquisition of this data is the first step in a larger plan to develop and implement interventions for safer transitions of care. RRUCLA's enrollment and randomization into a 30-h call schedule as part of the iCOMPARE trial, taking effect July of 2015, provides a natural interruption to the current admissions system. We plan to survey adverse events in the new system and compare their frequency to our findings from the current study involving 16 h work days.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): A difference in adverse events observed between de novo admissions and handoff patients or between admissions experiencing single signout vs double signout was sought. A reduction in adverse events after a new admissions system is implemented will serve to evaluate the intervention.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): During the study period, there were 354 admissions to the inpatient medicine teaching service, with surveys reflecting all of these admissions sent to 17

residents. One hundred ninety-seven surveys on these admissions were completed, with a total response rate of 56 %. Of those surveys completed, 105 (53 %) were de novo admissions (either direct admissions or transfers from another service) and 92 (47 %) were handoffs. Overall, 13 (6.5 %) adverse events were observed. 7/105 (7 %) events were observed in the de novo group and 6/92 (7 %) were seen in the handoff group. Among the latter, there were 2/70 (2.9 %) events in the holdover admission group, with 3/9 (33.3 %) in the double signout group. Because of the small number of events, the confidence intervals for the differences between the proportions are wide; for example, for holdover vs. the double signout group it is 30.5 %; 95 % CI (-.5 %, 62 %). 5/7 (71 %) de novo adverse events were due to poor documentation (either by an outside hospital or transferring service). In contrast, 4/6 (67 %) handoff admissions experienced medical management errors. All three of the adverse events arising from admissions involving double signout (100 %) had true medical management problems.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Although adverse event rates were similar in the de novo admissions and handoff groups, medical management errors were more predominate in the handoff group, implying that those admissions are more likely to result in near misses and patient injury (similar to how night coverage has been shown to affect patient care). Importantly, medical management errors encompassed all of the adverse events in the double signout group. The large proportion of errors attributed to documentation (both in the de novo and handoff admissions) highlights the fact that transitions of care in general are an important risk factor for adverse events, making them an area for intervention.